

# The Mining Journal

Established 1835

Railway & Commercial Gazette

Vol. CCXLVI No. 6299

LONDON, MAY 11, 1956

PRICE 9d.

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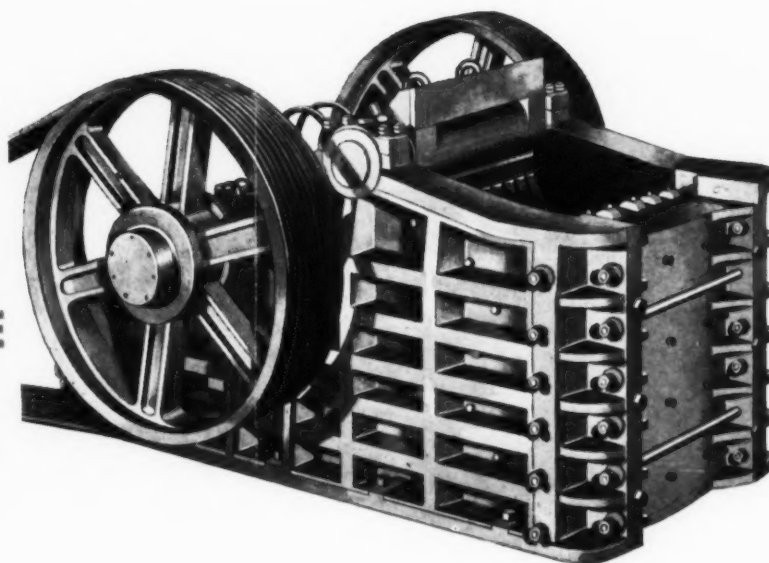
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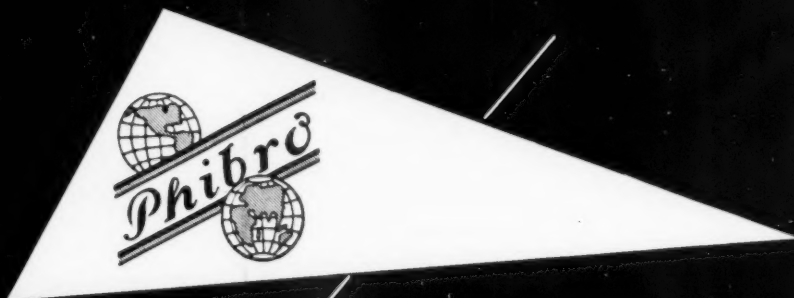
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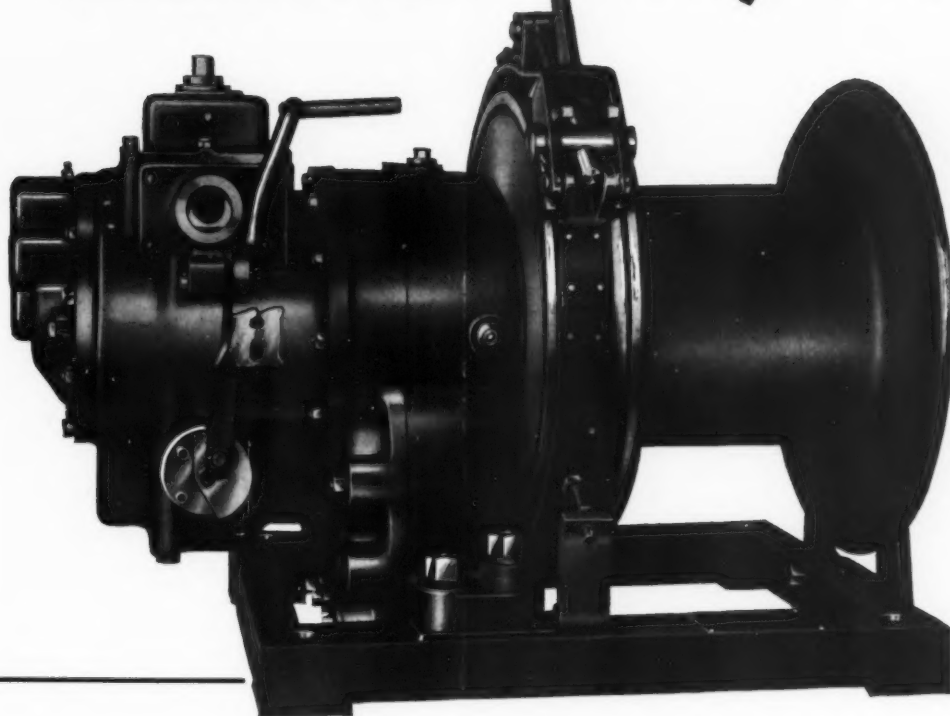
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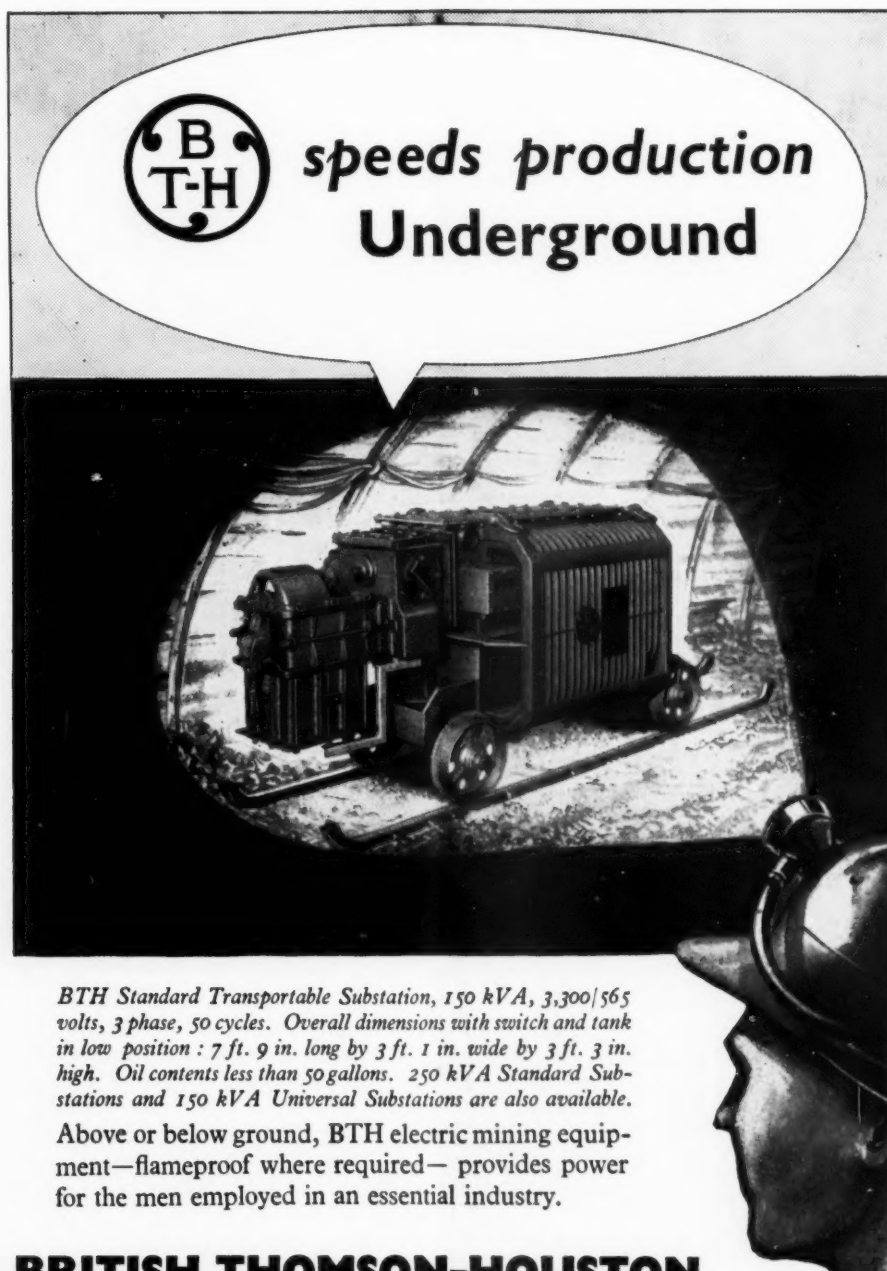
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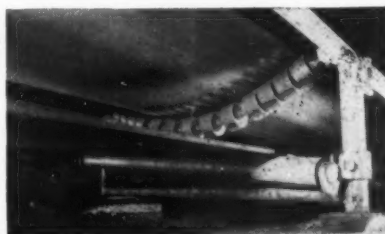
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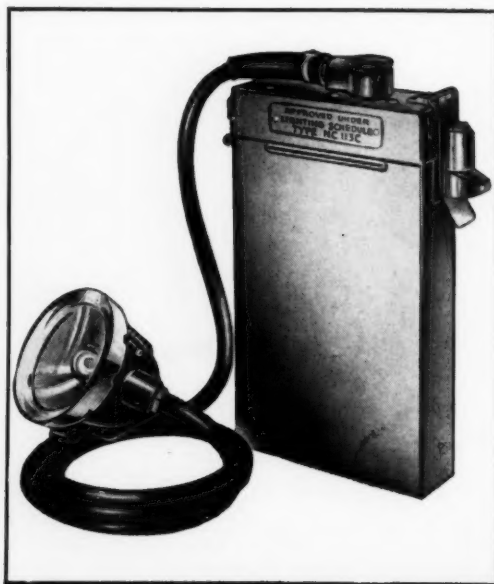
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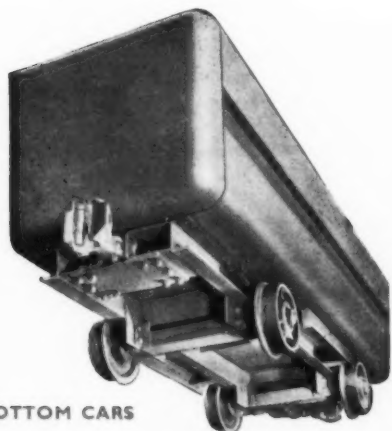
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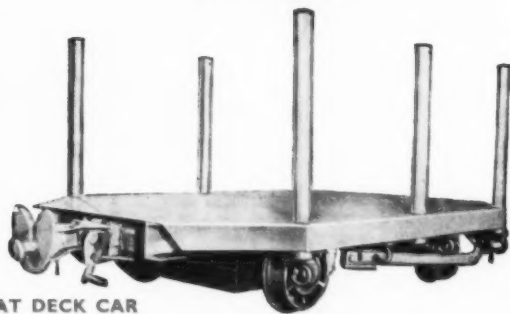
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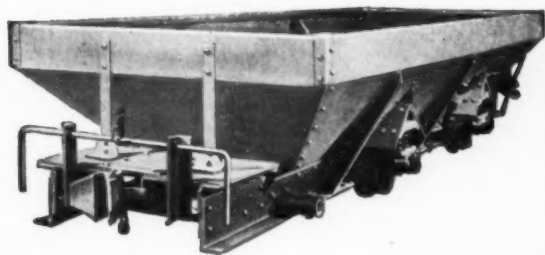
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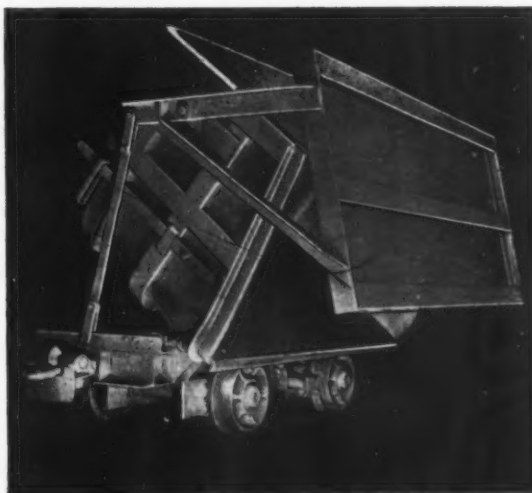
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Established 1835

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## NOTES AND COMMENTS

### British Steel is Still Cheap

The expressions of alarm and dismay which have greeted the decision of the Iron and Steel Board to authorize an advance in iron and steel prices may be regarded as a very natural re-action to the unfaltering whirl of the inflationary spiral. Confronted as they are with intensifying competition in world markets British engineers, motor manufacturers and shipbuilders—to mention no others, are seriously concerned about the rising trend of wages and prices of materials. Possibly delivery delays are a greater handicap to the export industries, but there is an abundance of testimony that we are in danger of pricing ourselves out of foreign markets, and it may be a fact of some significance that in the four months ended March 31 the total number in civil employment was reduced by 182,000. Only small pockets of unemployment have developed but it is understood that the fall in the number of vacant jobs has been continuous over a period of several months.

If, however, the trade traffic signals are changing from amber to red, the Iron and Steel Board has quite reasonably rejected the idea that the full burden of the steep rises in production costs which have taken place since July last should be placed fairly and squarely on the shoulders of the steel makers. A five per cent advance in the maximum home prices of iron and steel products—export prices are uncontrolled—has been conceded. This will no more than cover the extra cost of imported materials—iron ore, scrap, pig iron and steel semis—plus the 25 per cent rise in scrap prices.

Other extra costs, notably the recently negotiated advance in wages and the higher railway freight charges, which came into force on Monday, April 23, are still to be borne by the makers of iron and steel whose quotations include delivery charges. Thus even when allowance is made for greater operating efficiency, the net annual increase in the industry's costs is probably in the region of £40,000,000 against an extra income of £34,000,000 which the higher prices are expected to yield in a full year. Possibly the industry can absorb the difference. The Iron and Steel Board is content to wait and see, adding the assurance that this aspect of the steel trades economy will be kept under review.

There is one other unknown factor in this attempt to co-relate costs and prices. A further rise in coal prices is imminent and until the extent of the rise is known, it is impossible to entertain with any degree of confidence the hope that this week's advance in steel prices will be the last to be imposed in this year of grace. If this should prove to be the case the steel using industries should have no cause for complaint, since the revised quotations for steel in the home market are still averaging about 10 per cent below corresponding prices abroad.

British steel in short is still cheap, but there is not enough of it. Expansion of production at a rate much more rapid than has hitherto be envisaged, has become an urgent necessity. Direct exports of iron and steel in the first quarter of this year aggregated 76,000 tons less than in the corresponding period of 1955, not because of any shrinkage of demand, and in the same period imports were approximately doubled. Both trends should be reversed, but it will not be possible until new capacity is available.

### Egypt's New Mining Law

Details are now available of Egypt's new legislation on mines and quarries, which gives effect to a number of recommendations made by the Permanent Council for National Production. Its aim is to stimulate prospecting and mining of the country's mineral wealth. Raw combustibles remain subject to the provisions of Law No. 66 of 1953.

The new Law allows any individual or corporate body to explore for raw minerals by all available means without being required to obtain an exploration licence, as was formerly the case. A priority right to obtain a prospecting licence is bestowed on the explorer, provided his name appears on a register to be kept by the Department of Mines and Quarries and that the Department is notified by registered letter of the existence of the mineral. The applicant or his staff must have the required technical efficiency to carry out prospecting operations and the Department has the right to determine the amount which the applicant should be required to spend on such operations.

Whereas formerly prospecting licences were renewable yearly, they are now issued for periods of up to four years without renewal, as desired by the applicant. Exploitation

leases continue to be issued for periods of up to thirty years and can be renewed by an Arrêté of the Minister—subject to the same conditions—for a further period not exceeding thirty years. Thereafter the same lease may be renewed by a law, subject to conditions agreed upon between the Ministry and the lessee. For quarries, however, the maximum limit is fixed at thirty years, renewable for two periods not exceeding fifteen years each.

The new Law discriminates between procedural conditions entailed by mining leases and prospecting licences on the one hand and the substance of such leases and licences on the other. Whereas the former are subject at renewal to the rules and regulations in force at the time of renewal, the rights and financial obligations of the licensee or lessee will remain unchanged.

Royalties on the exploitation of raw minerals covered by the new Law have been abolished. Royalties in respect of the exploitation of quarry materials are retained, but in response to repeated complaints those relating to basalt have been substantially reduced. Holders of mining leases are authorized to extract free of charge from quarries in the area covered by the lease such materials as may be necessary for mining operations.

Owners of surface rights are exempted from the payment of rent if they undertake the work of prospecting or exploitation themselves.

#### A Good Year for CDC

The Colonial Development Corporation has had an undeniably good year. For the first time it has shown a profit—of £409,000; and for the first time since 1950, when disaster overtook it, it has raised its rate of spending approval. Of the 56 projects that it now has under control 10 are concerned with the development of mineral resources. This is the same number as in 1954, but one new project has been added and one has been dropped. Mineral development accounts for 11.6 per cent of the total capital approved and 13 per cent of the total capital deployed, so that there is a slight drop in the relative importance of mining in the CDC's work.

The new project is an examination of a small coalfield near Mbeya, South-West Tanganyika. "Good progress" is reported on the first stage of the geological survey. The importance of this scheme is that it is a potential power source for another project—the Mbeya Exploration Company which, with Billiton acting as consulting engineers and managing agents, is exploring pyrochlore deposits north of Lake Nyasa. The indicated ore reserves are 20,600,000 tons at 0.32 per cent  $Nb_2O_5$ ; and the second stage of pilot milling with further diamond drilling and underground observation began on January 1. The scheme abandoned was the Murongo Mines. It had 250,000 tons of ore at 0.3 per cent tin and on a scale of 200 tons a day could pay with a tin price of £800 a ton; this was considered too high. The scheme cost £259,845 of which £245,845 was written off.

Of the other schemes, British Guiana Goldfields should show more progress this year. Its 1955 gold output was 18,588 f.oz. (20,965 in 1954), but its Konawaruk dredge should be completed in May and in June it should receive power from the Potaro Hydro-Electric Company—another CDC project. British Guiana Goldfields is a revenue earner.

The Macalder-Nyanza mine was due to start mining and milling in April and was expected to reach its full rate of 10,000 tons a month in the last quarter of the year. The roast-leach plant will not be completed till June. The smelter at Jinja (belonging to Kilembe, but which Macalder-Nyanza will use) is not now expected to be ready

till October and this will set some disposal problems. Apart from the delay at Jinja, other schemes of the Kilembe Mines Ltd. are on schedule. The plant construction at the Kasese and Mobuku mine is proceeding according to schedule; the mine, concentrator copper section of roasts-leach plant at Kasese and the Mobuku hydro-electric plant are expected to be ready by June with full-scale output of 40,000 tons a month achieved by September. The building of the cobalt roast-leach plant at Kasese has been postponed pending tests in U.S.A. and Canada.

The position at Liganga Iron Ltd. is that the final report is completed. There are iron deposits about 50 miles north of coalfields east of Lake Nyasa but they are unlikely to be worth working till some other development in the area takes place. Frobisher Ltd., Anglo American Corporation and the Tanganyika Government share the capital with CDC. The same interests share control of Tanganyika Coalfields Ltd. The final report of this project is complete. There are 284,300,000 proved and 27,000,000 indicated tons of extractable coal in seams of 3 ft. or more. But until a railway is completed from Mchumchuma to Nachigwea the delivered costs of the coal cannot be computed. The position at Williamson Diamonds Ltd. is that the £500,000 approved by CDC has not been drawn upon; it was to be used for mechanization. At Tangold Mining Company the consulting engineers are considering the reports before making their final recommendations. The total work done in 1955 was development 2,379 ft., excavations 13,318 cu. ft., surface diamond drilling 829 ft., underground diamond drilling 5,976 ft.

This seems to be an excellent year's work, summarized in a straightforward and vigorous way which is characteristic of the chairman, Lord Reith. We cannot be other than grateful for the work of CDC in the mining field. But we cannot also forget that the fact that so much mining work falls available to CDC—which primarily interests itself in the schemes that are not sufficiently profitable for private enterprise—is only a reflection of present taxation levels and of mining taxation in particular.

## I.M.M. Annual Dinner

The need for putting technical, technological and scientific education on a sounder basis than it has ever been in the past was accorded particular attention by speakers at the Annual Dinner of the Institution of Mining and Metallurgy. This event was held at Grosvenor House, London, on May 3 under the chairmanship of the President, Mr. Stanley Robson. The principal guest was Sir Hugh Beaver, Chairman of the Advisory Council of the Department of Scientific and Industrial Research.

In proposing the toast of "The Institution," Sir Hugh Beaver said that to be a member of a professional institution gave the hall mark of attainment in that particular profession; it set standards of high ethical behaviour for its members; thirdly—and most important—it recognized and underlined the individual as against the machine. The individual challenge presented by each new job existed for every professional man; he had his own armoury with which to tackle the problem in front of him, and to a large extent he stood on his own feet to succeed or fail according to his own skill. One of the problems with which management was faced was how to keep imagination working and prevent the individual from atrophying. The professional man ran far less risk of deterioration than the ordinary member of an organization. For that reason he thought that the professions had a great part to play in a very broad way, apart from their own technical contributions.

In view of the steady growth of population, the great



problem was how to discover and exploit the resources and treasures of the world, and metals came second after food. The speaker hazarded the opinion that within ten years considerable mining activity would be taking place in the Antarctic. To Britain above all countries it was essential that the individual brain should have the chance of searching out new goals. He believed that the I.M.M., more than any other professional body, had the opportunity of supplying challenges and adventures to its members.

The President, in responding to the toast, expressed the Institution's gratitude to the mining and metallurgical companies for donations to the funds for travelling fellowships and scholarships. He recalled that the Institution was indebted to the Nuffield Foundation for putting at its disposal a sum of £5,000 a year for five years ending in 1951, which did much to help the teaching staffs and senior students of schools and universities. This led to another scheme for helping mining and engineering students and mining geologists, as well as mining engineers and metallurgists. This was also financed from funds provided in the first instance to a pool, including a further Nuffield donation of £3,000, all of which had now been spent in sending professional staff and senior research fellows abroad. Students were now encouraged to pay their way out of their earnings by spending vacations in mines and smelters. In 1955 loans made to students towards their travelling expenses amounted to £1,784, all of which was repaid.

Emphasizing the opportunities presented by the progressive growth of knowledge, the President pointed out that the U.S. Office of Materials Mobilization had appointed 14 industrial advisory committees to consult with and advise the O.M.M. on mineral matters. These committees were to serve as contacts between the mining industry and Government, the membership ranging from about 5 to 20 persons per committee. Britain could never hope to have available resources on such a scale, but the quality could be kept right by proper education.

The health of the guests was proposed by the President-Elect, Professor C. W. Dannatt, who expressed the thanks of the Institution to Sir David Eccles for the White Paper on technological education policy, which could be expected to bear considerable fruit. Sir David was responsible for the education system of to-day and to-morrow, and he stated, for seeing that in future the I.M.M. could rely on Cabinets which would include a larger number of persons having some nodding acquaintance with their subject.

Replying, Sir David said that the number of technologists in Britain had to be very greatly increased, and this must be done in co-operation with all the great institutions. It was the Government's intention to go into the highways and by-ways to try to catch people at any age where they were willing to take advanced courses. This might necessitate more flexible methods of acquiring the highest qualifications. Nothing could be more helpful than a feeling among young people that it would be worthwhile to give up actually earning for the time being, or getting a higher salary, and spend some time in college. He hoped that members of the Institution would give as much encouragement as possible to any young man who showed the slightest inclination to improve his qualifications.

As Sir David Eccles pointed out, one way in which the professional bodies could be of great assistance is in regard to the quality of the teaching in technical institutions. The Government intends to do all it can by giving better salaries and by recruitment to get graduates from the universities to come and teach, but a large addition of part-time teachers will always be necessary and, in fact, desirable. It inspires young men enormously to feel that those who are successful in their profession are willing to give up a little time to teaching the next generation.

## Western United States

(From Our Own Correspondent)

Portland, Oregon, April 24.

Definite opposition is being evinced by the mining industry towards HR 5550, which would authorize the United States to join the Organization of Trade Co-operation. Representatives of the American Mining Congress and different branches of the industry, notably lead and zinc, have appeared before the House Ways and Means Committee which is conducting hearings on the Bill. It is argued that approval would be tantamount to endorsing the General Agreement on Tariffs and Trade and would bind this country to complex rules for the conduct of international trade and that the United States would have only one vote in 35 with no power of veto. Furthermore, if past experience is a criterion it would wind up with the United States paying the lion's share of the expenses.

Government purchase programmes for domestic minerals are coming in for a great deal of attention in both House and Senate. Senator Murray of Montana and Representative Pfof of Idaho, have introduced companion bills that would take the purchase of seven basic strategic minerals, asbestos, beryl, chromite, columbium-tantalum, manganese, mica and tungsten, from the Office of Defense Mobilization and the General Services Administration and place them under a Strategic and Critical Minerals Administration to be created. The new policy would supplant the purchase of these minerals by the Government at above market prices with direct price supports to the producers and emphasize building up an incentive for long-range production rather than the accumulation of supplies.

This action has in mind that present programmes in these minerals will run out in fiscal 1957 and there is little likelihood of renewal. It is hoped by the sponsors that such a new policy will create a healthy industry in these minerals which would not require revival in case of an emergency and be less expensive to the Government.

As an outcome of the meeting of the Western Governors' Advisory Council (*The Mining Journal*, December 9, 1955), a joint resolution has been introduced into Congress "expressing the sense of the Congress with respect to a sound national minerals policy and directing the Secretary of the Interior to take certain action in furtherance of such policy". The bill instructs the Secretary to submit to Congress his recommendations for legislation which will tend to stabilize the industry with respect to both the strategic and the common minerals. The bill itself is quite innocuous as it merely calls for recommendations and allows the Secretary a year in which to formulate them.

### THE LABOUR WARS

With a battle with AFL-CIO for control of bargaining rights in the offing Mine, Mill and Smelter Workers' Union is readying new demands for wage increases. Reports are that a demand will be made for 30 c. an hour, either as a flat pay increase or a split between pay and "fringe benefits". Union leaders argue that while production and prices have increased notably employment has dropped 17 per cent since 1947 due to increased mechanization and the workers can claim a share in the increase.

A recent report from the Arizona Employment Security Commission states that during February copper miners in that state averaged \$115.40 weekly pay for 49.8 hours of work. Mine-Mill is preparing to take an active part in the coming political campaign and has already picked 17 Senatorial and 75 Congressional areas as battlegrounds.

## NUCLEAR ENERGY IN MINING—I.

# Raw Materials of Atomic Power Development

On December 4, 1954, the United Nations Assembly unanimously adopted a proposal for the establishment of an International Atomic Energy Agency. One part of this resolution called for an international conference on the peaceful uses of atomic energy, and this was held at the European Headquarters of the United Nations in Geneva during August 8 to 20, 1955. About 1,260 delegates and advisers from seventy-two nations took part, and 1,048 scientific papers were presented by twenty-five countries, three specialized agencies and the U.N. itself. A careful analysis of the disclosures made to the Assembly gives an indication of future trends in the development of atomic power which are of importance to the mining industry. The following article, the first of a series, is an attempt to extract the salient facts from a wealth of published data. If the article does not indicate a definite trend in the development of atomic power, it at least narrows the field of speculation.

The demand for power is increasing throughout the world and the world's energy requirements are expected to be at least double the present figure within 20 years. Some under-developed areas can meet future demands from existing reserves of conventional fuels, but other highly developed countries have limited resources within their own boundaries. Known world reserves of coal and oil are sufficient, however, to supply the anticipated demand for energy in the foreseeable future. The development of atomic power is not, therefore, the salvation of a world depleted of other energy sources as some observers asserted.

There are obvious advantages to being independent of imported fuel, and it is political rather than engineering objections which have blocked such schemes as the harnessing of the natural gas of the Middle East by pipeline distribution to European centres.

## THE STRATEGIC ASPECT

In defining the strategic aspect of atomic power development, it is found that the U.S.A. has an assured uranium supply in Canada as well as the Colorado Plateau deposits within her own borders. The uranium resources of the U.S.S.R. are unknown, but it can be assumed that ample supplies exist in those vast territories. There are also reserves of uranium sufficient for France's present atomic development programme within the borders of metropolitan France.

The United Kingdom, however, although well in the fore of atomic power development, has no commercial deposits of uranium and depends on imported high grade ore and concentrates. Strategically, therefore, atomic power is of less value to the U.K. than to the other great powers. It must be noted, however, that in this respect Britain is only slightly better off for the conventional fuels, oil and coal.

The strategic factor will obviously influence both the choice of atomic reactor systems developed in this country and the exploration policy of the Atomic Energy division of the Geological Survey. Whilst economic deposits of uranium ores have not yet been found in the United Kingdom, considerable effort is being expended in the search and evaluation of known occurrences and further developments in this direction can be expected. Uranium may yet be found in economic quantities in Cornwall or produced as a by-product of tin mining operations, and the search has recently been extended to Pre-Cambrian areas of Scotland.

## NUCLEAR ENERGY AS A BY-PRODUCT

Nuclear energy can be considered as a by-product in the manufacture of atomic weapons, and the development of the atomic power programme follows naturally upon the establishment of factories manufacturing plutonium for military purposes. Plutonium produced in one reactor, however, can also be used as the initial inventory of fissile material in another type of reactor, and although the development of atomic power still centres around plutonium, it can now be divorced from the purely military considerations which led to its initiation. The incentive

now is the possibility of nuclear energy being produced more cheaply than power developed by conventional means.

Various types of reactor construction in the U.S.A., U.S.S.R., Britain and elsewhere, have effectively demonstrated the possibilities of cheap power, and developments in reactors are of obvious importance to the mining industry as the producer of whatever fuel is used.

Most reactors constructed or projected to date employ a solid fuel but any material containing the critical amount of a fissile isotope can be used in solid, liquid or gaseous form. Natural uranium contains 0.72 per cent of a fissile isotope U-235, the balance being the U-238 isotope. Plutonium is produced from U-238 and a third fissile isotope, U-233, can be produced from thorium. A natural-uranium-fuelled reactor thus contains a fissile material U-235 and a "fertile" material U-238 from which other fissile material can be bred, and these reactors are the basis of present development programmes.

Before considering further nuclear power development it is logical to attempt to assess the military demand for uranium, and here security restrictions have allowed only an extreme paucity of information.

## MILITARY ASPECTS OF URANIUM

On August 6, 1945, the first atomic bomb was dropped on Hiroshima and was later stated to have been a uranium bomb releasing energy equivalent to 20,000 tons of TNT. The second bomb was a plutonium bomb dropped on Nagasaki and was much more powerful.

The intrinsic energy in the atom is enormous. When mass is converted to energy, the energy released is 39,000,000,000,000 BTh.U. per lb., but only one-thousandth of the mass of the atomic nucleus is converted to energy during fission. The energy released on fission, therefore, is over 13,500,000,000 ft. tons per lb. of uranium.

The theoretical heat of combustion of trinitrotoluene is 3,616 cal./gm., but since TNT contains less than half the amount of oxygen necessary for complete combustion, the energy released on explosion is only of the order of 670 ft. tons per lb. One ton of uranium fissioned is, therefore, equivalent in terms of energy released to about 20,000,000 tons of TNT.

Recent American hydrogen bomb tests have resulted in energy release equivalent to 15 to 18 megatons of TNT, and although these weapons were exploded on the ground, the ultimate objective is to perfect a deliverable thermonuclear bomb. The bomb load of present-day aircraft is of the order of 20 tons and the bomb will have to be within this limit. Ignoring the weight of the mechanism and of the casing to the bomb, reputedly cobalt, it is found that a bomb containing 20 tons of uranium would release energy equivalent to 20 megatons of TNT if the efficiency of the explosion were only 5 per cent. A loss of efficiency will occur due to some of the uranium charge being dispersed by the explosion before fissioning takes place, but no information has been declassified on which to assess the actual efficiency achieved or the uranium requirements,



The advent of the thermonuclear bomb would in any case appear to have made this information and the atomic bomb redundant. The main force of these weapons is apparently derived from deuterium or tritium in the form of light metal hydrides, lithium reputedly being the light metal used. Uranium fission is used to generate the high temperatures required to trigger the fusion reaction and explode the bomb, but to do this the uranium core need be only slightly larger than the critical amount required to sustain a chain reaction. The critical amount of U235 has been stated to be various amounts between 30 lb. and 220 lb. and can be calculated, once certain assumptions are made, to be of the order of 100 lb.

This would seem to indicate that military uranium requirements are now much smaller than had previously been anticipated, and may be one further factor influencing the recent American decision to release considerable quantities of fissile uranium for power generation purposes.

The devastation wrought by nuclear weapons is such that one bomb could virtually destroy the largest city and a hundred or so bombs of 20 megatons power stockpiled in the arsenals of the Western World would be sufficient to wage war on a scale sufficient to endanger the very existence of man on earth. The power of these bombs in itself constitutes a deterrent to their manufacture.

#### CIVIL USES OF ATOMIC ENERGY

Britain's nuclear energy programme is based on reactors using natural uranium as a fuel and these will produce plutonium. This plutonium can be used for the manufacture of bombs or it can be used instead for natural uranium in a reactor of the same type as produced it, or with uranium 238 in another type of thermal reactor to produce more plutonium. The quantity of plutonium produced in natural uranium reactors is less than the uranium 235 consumed so that the gain factor is negative.

The credit for by-product plutonium at £10 per gram is such, however, that the cost of energy produced in the reactor is, on paper at least, competitive with conventional thermal power stations. The price of plutonium cannot be assumed to remain at £10 per gram as the nuclear power programme develops, but as a lower credit to the plutonium-producing reactor means a lower fuel cost to the plutonium-consuming reactor the system as a whole may remain economic. An interlocking system of this type is the most likely development over the next 20 years or so.

#### MAINTENANCE OF CHAIN REACTION

However, before this system is established, sufficient plutonium must be produced to provide the large initial inventory required to initiate a chain reaction in a plutonium reactor. Moreover present research is aimed at increasing the irradiation factor of natural uranium reactors to 10,000 megawatt days per ton of uranium from the 3,000 MWD/ton in present day reactors. This implies a lesser production of plutonium and a further postponement of the advent of plutonium-fuelled reactors.

It is possible to calculate the tonnage of uranium required to yield a given quantity of electricity using these figures. In 10 years time it is hoped that Britain will be producing 2,000,000 kW-years from nuclear power stations. Assuming that an irradiation level of 10,000 MWD/ton is attained and that the conversion of thermal to electric power is 25 per cent efficient, the consumption of uranium will be 292 tons per annum. During the time taken to achieve this level of generation the starting inventory for the reactors will have to be built up. In terms of annual requirements this will add perhaps a further 100 tons to the nation's uranium requirements. An annual consumption

of uranium in the British Isles of some 400 tons per annum is thus assessed.

#### WORLD REQUIREMENTS

World energy requirements in 20 years are estimated to reach at least double the present figure, but some of this energy will be provided in the form of metallurgical coke and a great deal in the form of distillate oils for transport. This still leaves an estimated 10,000,000,000 megawatt-hours to be provided from other sources. Most of this will be accounted for by the use of conventional fuels and increased efficiency in the use of such fuels. Atomic power also seems an unlikely competitor of low-cost hydro-electric power and some of the increased energy needs will be met by harnessing more of the vast potential sources of hydro-power still remaining in the world.

It is extremely difficult to forecast how much of this increased power need will be met by atomic generation until operating costs for actual stations are available but the maximum plausible figure would seem to be about 5 per cent although considerably higher estimates have been made. Fulfilling this predicted role atomic plants would require something of the order of 11,000 tons of metallic uranium annually equivalent to approximately 14,000 tons of uranium oxide ( $U_3O_8$ ).

### Yugoslavia's Majdanpek Project

The recent Soviet offer to help Yugoslavia carry out her Majdanpek industrial project, coupled with current high world copper prices, have once again brought this plan to the fore. The plan was in the news two years ago when Japanese experts visited Yugoslavia to study ways of increasing the country's output of metal ores, under the auspices of the United Nations' Technical Assistance Programme.

In the meantime, France, with U.S. backing, had offered to help by supplying machinery and plant on a credit basis with repayment to be made over five years in copper produced in the new installations.

This complex industrial project foresees the following undertakings. First, the setting up of an opencast mine and the construction of a flotation plant at Majdanpek in Eastern Serbia, with an annual treatment capacity of 3,600,000 tons of ore. Second, the construction of a new smelter and of a sulphuric acid plant at Bor. The smelter will have an annual capacity of 55,000 tons of copper (30,000 tons from Bor and 25,000 tons from Majdanpek). The other plant will have an annual capacity of 230,000 tons of sulphuric acid.

Other potentials include the construction of a plant at Prohovo on the Danube, which would use the sulphuric acid from Bor to produce about 575,000 tons of superphosphates annually, and the construction of the necessary rail links and expansion of the harbour at Prohovo.

The whole project is based on the exploitable proved reserves of 50,500,000 tons of 1.615 per cent copper ore at Bor and of 160,000,000 tons of 0.801 per cent ore at Majdanpek. These reserves would permit the production of 55,000 tons of copper annually over a period of 27 years. There would also be an output of about 30 tons of silver and some 2,000 kilos of gold annually.

An increase in copper output to 55,000 tons from the current level of around 32,000 tons would permit capacity running of the Sevojno rolling mills which produce 17,500 tons a year, and of the Svetozarevo cable mills (15,500 tons).

# Significance of Certain North African Mineral Deposits

While minerals remain a material necessity of mankind, it is to be anticipated that political influences will not be unaffected by the existence, and possible ownership, of economic deposits. This interest lately has been markedly revealed in Morocco, where nationalistic opinion insists that the borders of the former protectorate were arbitrarily drawn by France, and that coal and iron ore deposits currently in Algeria—theoretically a part of France—are in reality Moroccan possessions. The following article describes the potentials of the deposits concerned, and their geographical relationship with the existing frontier.

After obtaining their independence from France on March 2 this year, members of the Moroccan Government devoted their energies to settling the problem of uniting Morocco, for 44 years divided into French and Spanish protectorates. This unification is now virtually realized, so that the latest rallying cry of the two main political parties has become the question of existing boundaries between Morocco and Algeria. In the area around Colomb Bechar, where large iron ore and anthracite deposits have been discovered at Kenadsa and Abadla, the French authorities for a long time have discussed plans to establish a mammoth mining and metallurgical industry controlled by various kinds of consortia, which, it was thought, would have the advantage of being situated on French soil in Algeria.

However, the Algero-Moroccan boundary makes a large loop around Colomb Bechar and the mineral deposits in question, and this is what Moroccan political leaders call "an arbitrary line", which they claim deprived them of part of their territory.

## THE FRONTIER AND THE CLAIMS

From Colomb Bechar the frontier goes for 500 miles south-westwards to the Spanish colony of Rio de Oro in such a way that it cuts off the desert town of Tindouf from Morocco. In Tindouf, high-grade iron ore deposits, with a metal content tentatively estimated at 45 to 50 per cent, and where total reserves are thought to be at least 60,000,000 tons, have since 1947 been the subject of further French plans designed to extract the ore and evacuate it via the Moroccan port of Agadir on the Atlantic coast.

This 500-mile-long part of the frontier is strongly disputed by Moroccan political leaders who claim that the dotted line across the desert map should be advanced into Algeria for several hundred miles in places. Such a modification would give Morocco the greater part of the Sahara's known and exploitable mineral resources, and would almost certainly put an end to French plans for opening up mines in the area.

Certain members of the most powerful nationalist party in Morocco, the Istiqlal, have even more ambitious territorial pretensions. They claim as part of Morocco almost the whole of the Spanish colony of Rio de Oro with its desert hinterland, including Fort Gouraud, where another large and rich iron ore deposit has been confirmed. Theoretically, Fort Gouraud is in the Mauretania province of French West Africa.

If all these territorial claims are satisfied, Morocco's present area would be increased almost three times, and it will be hard for France to counter the claims because the frontiers in question have never been clearly defined. On the other hand, Morocco's history shows that the Sultan's authority once extended deep into what is now known as the French Sahara.

A factor which tends to make substantiation of Moroccan claims easier, is the fact that before the French arrived in Algeria there was no effective governmental or administrative control in the vast expanses of the Sahara, the Dey

of Algiers confining his authority to a small patch of territory around the city only. This means that the Sultan of Morocco could easily lay claim to all the desert between Morocco and Timbuctoo which was conquered by a former Moroccan sultan and made a tributary territory for at least two centuries.

The claims are reported to be an attempt on the part of Moroccan nationalist leaders to forestall French plans to separate the Sahara from Algeria and to turn it into an autonomous territory from the administrative point of view. The idea behind the French plan was to facilitate the exploitation of any mineral deposits in the desert, including any oil which may be found in the course of the present prospecting campaign by withdrawing the area from the disruptive and unsettling influences of the political situation in Tunisia, Algeria or Morocco.

The worsening of the situation in Algeria has meant that all such plans must be left in abeyance for the moment, if not abandoned all together, in view of the distinct possibility of Algeria's status being radically changed in the near future, from being legally a part of France into something approaching autonomy.

In these circumstances, the Sahara's mineral resources, which for so long have been the subject of numerous ambitious plans designed to exploit them, will again be put off into a clouded and unsettled future in which the "Eurafrican" cause and other projects may well be lost.

## NATIONALIZATION AND MINERAL DEPOSITS

Another aspect of Moroccan nationalist policy which can have a profound effect on the mining industry is the recent tendency towards the idea of nationalization which has been given prominence in party newspapers. It will be recalled that the Moroccan phosphate mines (producing 5,000,000 tons a year) are a State monopoly, and that the Société Cherifienne des Pétroles (110,000 tons of crude oil a year) is controlled by the State, also by means of its majority share holdings. These two enterprises are pointed to as the ideal to be attained, and it is intimated that the Bureau des Recherches Pétrolières et Minières, also controlled almost entirely by the State, could be the instrument for the foundation and development of nationalized mining enterprises.

The native Minister of Industry and Mines, Si Thami el Wazzani, is perhaps the most capable of nationalist leaders to take over the direction of a technical department in the Moroccan Government. He is a graduate of the French Polytechnic School and is known to be keenly interested in mining questions. However, Si Wazzani is also a member of the Democratic Independence Party which in recent weeks has been the most ardent supporter of nationalization, a system which many members of the party would like to be applied immediately to the Moroccan road transport networks and then to major industries. All political parties in Morocco lean to the left, without exception they are inspired by socialist ideology, and past experience has proved that policies expressed in their newspapers are ultimately put into effect.

# Increasing the Sources of Mineral Raw Materials in the U.S.S.R.

The draft directives of the twentieth party Congress of the Soviet Union on the sixth Five-Year Plan, envisage a further expansion of the sources of mineral raw material in the U.S.S.R. The following article presents these directives in précis. Whether the targets set out can be achieved remains to be seen as past experience does not allow for undue optimism.

In the U.S.S.R. during the next five years, it is planned to increase prospected reserves of high-grade iron ores and nickel by 30 to 35 per cent, of copper, bauxite, titanium phosphorites and boron raw materials by 40-45 per cent, niobium by 50-55 per cent, lead and tin 55-60 per cent, molybdenum 65-70 per cent, mercury 75-80 per cent, and oil 65-70 per cent. A 35-40 per cent increase in the capacity of coalfields providing fuel for the production of power, and a minimum increase of 40 per cent in the capacity of coalfields producing coking coal, are also envisaged.

## RESEARCH AND PROSPECTING

To solve these problems an extension of research and prospecting work on minerals in all the geologically favourable regions of the Soviet Union will be necessary. Prospecting must be increased in the eastern regions for new deposits of oil and gas, non-ferrous and rare metals, titanium and manganese ores. Geological prospecting work must also be carried on to organize new coalfields, producing coking coal, in the Donets, Pechora, Kuznetsk and South Yakutia basins, fields producing low ash and coking coal in Kazakhstan, and fields providing coal for power production in the European part of the U.S.S.R., in the Urals and in Central Asia.

The work of Soviet geologists in Kazakhstan has revealed numerous new deposits of iron and manganese, coal and oil, titanium and bauxite, various non-ferrous and rare metals and non-metallic minerals. New centres of industry will be set up on the basis of these deposits.

The Soviet government has a high appreciation of Kazakhstan's importance in the further development and strengthening of the Soviet Union's mineral raw materials potential and has decided to form a Union-Republican Ministry of Geology and Conservation of Mineral Wealth of Kazakhstan.

One of the main tasks of the newly-organized Ministry is to increase considerably the prospecting and research work in the rich Jezkazgan district. Research will also be continued on other copper deposits of Central Kazakhstan. A further task is to increase the prospecting of known deposits of lead and zinc and find new deposits of these metals, as Kazakhstan holds out as great prospects for these metals as it does for copper.

It will be necessary to intensify research and prospecting in the Altai, the largest source of raw materials for the lead and zinc industry while in addition Kazakhstan is regarded as playing an "important role" in so far as the reserves and production of molybdenum are concerned.

Other scheduled tasks include that of ensuring the further development of the Karaganda coal basin and the Ekibastuz coal deposits; of carrying out work on a large scale for the utilization of the mineral deposits discovered in the Kustania region, as well as the construction and bringing into service of the Turgai bauxite mine and the Sokolovsk-Sarbai ore-refining enterprise, which is to have a capacity of 10,000,000 tons of crude iron ore, ensuring an output of 5,600,000 tons of finished ore in 1960.

As a result of geological prospecting work carried out in

the Yakut Autonomous Republic, deposits of high-quality iron ores, with deposits of coking coal in the vicinity, have been discovered and are being successfully prospected. A number of valuable deposits of non-ferrous and rare metals have also been revealed. The numerous rich placers and big main deposits of diamonds discovered in recent years are of importance, for with these deposits as a basis, it will be possible to develop diamond mining within a very short period to a scale that will satisfy the needs of the national economy.

Extensive geological research is to be carried out in other districts of Siberia and in the Far East. In the Maritime and Khabarovsk territories prospecting for tin ore deposits will be intensified. Again, the search for new deposits of molybdenum must be intensified in promising districts in Siberia and the Far East.

Prospecting for non-ferrous metals in East Transbaikalia and the Maritime districts is to be developed. In the same districts there is to be intensified prospecting for rare metals (beryllium, tantalum, niobium, yttrium, lithium and others). The search for rich titanium ores, piezo-optical raw materials and boron will also be intensified. In Western Siberia, the Krasnoyarsk territory and the Urals there are good prospects for finding new deposits of nickel.

## NEW FACTORIES PLANNED

A number of copper-smelting factories in the Central Urals are experiencing a shortage of copper concentrates, these concentrates being brought in part from Jezkazgan and the South Urals mines. For this reason one of the most important immediate tasks is to accentuate prospecting for new copper deposits within the confines of the main and eastern green-stone belts of the Central Urals. At the same time, prospecting for copper will also be developed in the Southern Urals.

In order to extend the sources of raw materials for the Kuznetsk Iron and Steel Works and to ensure supplies for the proposed second Siberian Iron and Steel Works, prospecting for iron ore deposits will be intensified in the Gornaya Shoria and Kuznetsk-Ala Tau districts, the Krasnoyarsk territory and the Irkutsk region. In addition, prospecting will be continued in the Eastern Transurals and in the Magnitogorsk area to ensure supplies for the proposed development of the Urals iron and steel industry.

A increase in aluminium production is proposed, by which output will rise by 110 per cent compared with 1955. New aluminium factories in the Krasnoyarsk Territory and Western Siberia will be established.

In the Ukraine considerable geological and prospecting work will be carried out to extend the sources of raw materials for the iron and steel industry of the south, to search for new deposits of mercury in the Transcarpathian and Donbas districts, and to prospect for titanium and zirconium. From the geological point of view, there are favourable prospects in the Caucasus and Transcaucasia for further extending the raw materials base for molybdenum and copper in Armenia and Azerbaijan. In Georgia and Northern Ossetia the search for new deposits of lead and zinc and certain other minerals will be intensified.



# Drilling in Soft or Unconsolidated Sediments

Two drilling systems common in the United Kingdom are the percussion and the straight mud-flush rotary, although the reverse circulation system—little known in this country—is becoming common practice overseas in territories where water is required in large quantities with the minimum of delay. The following article discusses aspects of drilling for water in specific sediments, and describes the 30-50 hydro-rig which was demonstrated by Argelane Ltd. last month with the co-operation of the Dorking Water Co. The reverse circulation drilling system is of particular interest in that it enables the casing or mud support of hole walls to be discontinued.

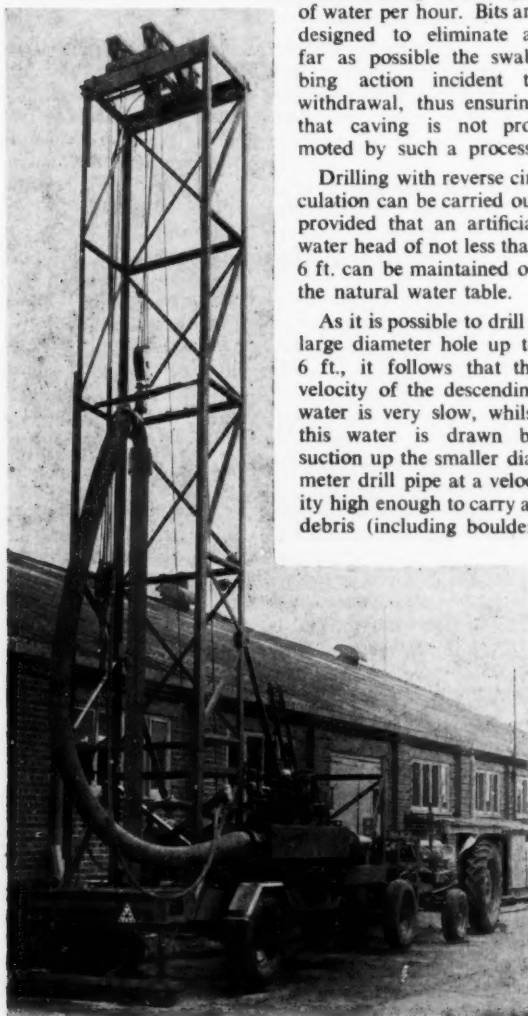
In the reverse circulation system, the formation or strata is penetrated by a slowly rotating scraper or other type of drill attached to a column of large diameter drill pipe; the cuttings are sucked up this drill pipe by an efficient gravel suction pump. This pump delivers into an open pit filled with water. From here comparatively clean water is allowed to flow very gently into the annular space between the drill pipe and the walls of the hole.

## USE OF THE SYSTEM

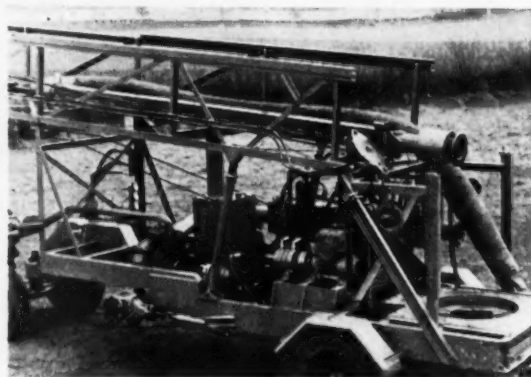
The system gives a very clean sand face and therefore enables the descending clean water to penetrate the porous formations. By virtue of this movement inward from the hole to the sand, the face of the formation is restricted from collapsing; this maintenance in equilibrium of the sand face can absorb up to 1,000 gal. of water per hour. Bits are designed to eliminate as far as possible the swabbing action incident to withdrawal, thus ensuring that caving is not promoted by such a process.

Drilling with reverse circulation can be carried out provided that an artificial water head of not less than 6 ft. can be maintained on the natural water table.

As it is possible to drill a large diameter hole up to 6 ft., it follows that the velocity of the descending water is very slow, whilst this water is drawn by suction up the smaller diameter drill pipe at a velocity high enough to carry all debris (including boulders



The 30-50 Hydro-Rig with self-supporting mast erected



The rig with mast lowered

within the limits of the diameter of the drill pipe) to the surface. There is, therefore, no washing and eroding effect on the wall of the hole from the velocity of the circulating fluid; nor is there any abrasive effect from the formation cuttings which are never in contact with the wall of the hole.

It can be seen that the debris removed at the point of drilling is brought to the surface very quickly and without any contamination from other strata. Because of this factor, samples are extremely accurate.

The resulting hole stands up provided it is kept full of fresh water; its large diameter, the velocity of water at the sand face and the permeability and cleanliness of the sand face itself, give a combination of features very suitable for its completion as a gravel shrouded well.

Reverse circulation drilled holes are of large diameter and therefore, with less drawdown, will yield the same production as a well of smaller diameter; this reduces the horse-power required for pumping and hence the operating costs.

## THE 30-50 HYDRO-RIG

The 30-50 Hydro-Rig is designed to drill up to 30 in. dia. holes to a depth of 500 ft. by reverse circulation. The rig is trailer-mounted with 90 deg. rotatable full rocking front axle. It is capable of being moved by any standard rubber-tired tractor having an engine of 40 b.h.p., and after moving the rig to the site this tractor becomes a power unit driving all services of the rig. In its travelling position the rig has a maximum length of 27 ft. 6 in. a maximum height of 10 ft., and maximum width of 7 ft. 6 in. Erected, the mast is 30 ft. high.

This mast has been built to a rated capacity of 20,000 lb., is of fabricated construction and is self-supporting. The mast is raised hydraulically and is able to handle random 20 ft. lengths of water-well casing. The main frame is a fabricated lightweight structure 18 ft. 6 in. long and mounted on 30 in. by 10 in. heavy duty tyres.

The 30-50 differs from other reverse circulation rigs in several particulars, amongst which are its light weight of 11,000 lb., its entire operation by the hydraulic system and with the hydraulic fluid cooled by the circulating water. The hydraulic fluid itself lubricates the motors.

## MACHINERY AND EQUIPMENT

### Combating Mining Subsidence

The National Coal Board has approved the use of special process to combat mining subsidence. To remove the danger of subsidence of the surface near coal fields, some means of support must be provided within underground workings. In areas which are of no further use, the workings are usually filled in with pit spoilage which is crushed, mixed into a slurry with water, and forced by compressed air through steel pipes into the workings.

The aggregate forms into a concrete-like mass and is able to withstand a great amount of pressure. But due to the extremely abrasive nature of the aggregate, the bore of the stowing pipes is subjected to a considerable amount of wear and the process becomes uneconomical.

With a view to lengthening the life of the pipes, British Oxygen Gases Ltd. have been experimenting on the internal hardening of a number of pipes by the use of their flame-hardening process. The pipes have been subjected to field tests over a considerable period, and the results have proved very satisfactory. The National Coal Board has now placed a contract for the treatment of a large number of pipes by the new process.

### Construction of Man-Riding Cars

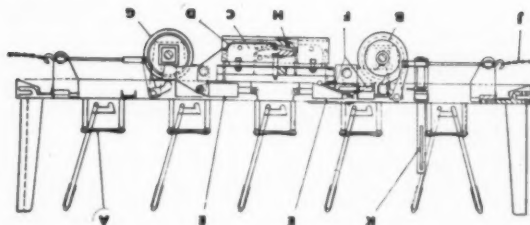
In *Transactions of The Institution of Mining Engineers*, Vol. 115, Part 5, P. G. Taigel, B.Sc., Ph.D., M.I.Mech.E., presented a review of man-riding in steep drifts in South Wales, Lancashire and Yorkshire. In these areas 50 haulages on gradients of 1:5 or over, ride 2,500 men with a maximum of 96 men at one time. The use of safety devices on the steepest gradients is exceptional and some, such as drags or the Rearer carriage, can cause a lapse of safety efficiency.

Experiments with track-brake vehicles have shown that with dry rails and high coefficients of friction it is possible to arrest a vehicle on a gradient of 1:3 to 1:2.5. For steeper gradients the dead rope system could be used. For more general application, where both men and material have to be hauled, braking on a special third rail was reported to have many advantages.

An interesting development in the field of personnel transport underground is the subject of various patent applications by John Ingham and Sons Ltd. These cover the design and construction of man-riding cars known as Automat, with hydraulic suspension and speed-governed automatic track braking.

The illustration above shows the general arrangement of a master car designed for use with any number of individually braked cars, all of which function automatically as soon as the speed of the train exceeds a pre-determined limit. A hand-applied emergency lever is also provided on each car which similarly brings all the train brakes into action.

The principle employed rests on the cars being hydraulically



The Automat man-riding car showing, A seating plan, B axle-mounted balanced centrifugal type overspeed governor, C centrally disposed extra length track brakes cushioned to chassis, D fabric brake linings on detachable mountings, E hydraulic power pack suspension control with coil spring dampers, F built-in hydraulic Master pump and release valve unit, G precision bearing wheel sets, H integral "fastlock" rope clip arranged to traverse curves, J positive sequence brake operation to next car and, K manual brake control

suspended by horizontally disposed rams, equipped with coil spring dampers operating through bell crank levers to the axle boxes, each car having a built-in hydraulic hand-operated pump. An axle driven balanced centrifugal type governor is arranged to trip a release valve, thereby lowering the whole car and bringing the large area centrally disposed track brake shoes into operation.

Linkages between the cars forming the train are so connected that the actuation of the brake on the master or any car will arrest the whole train. The brake shoes are substantially cushioned to provide even application and the linings are readily renewed, whilst the coil spring suspension system is effective in reducing passenger discomfort on uneven track. Seating may be arranged to suit individual requirements.

### A Long Shothole Drilling Rig

A drilling rig, designed for drilling long shotholes for pulsed infusion shotfiring, has been designed recently by personnel of the British coal mining industry. A prototype of the rig has been installed at Bowburn Colliery, S.W. Durham, and has given satisfactory results in drilling of pillars 90 ft. sq. Tests have shown that longholes can be bored with sufficient accuracy up to 180 ft. in length.

For longhole drilling the machine must be capable of great accuracy both on the horizontal and vertical planes, and to achieve this the Bowburn rig incorporates a sighting gear which allows accurate sighting along the full length of the face, and a system of jacks which allows the rig to be braced rigidly against roof and floor once alignment is complete.

A flame target lamp at the far end of the face is used for sighting purposes; the sighting tube itself has a small hole at the viewing end and crossed hairs at the object end. The rig runs on track laid up a roadway at right angles to the working face; when the drilling point is reached the rig is raised from the bogey by lowering a foot jack which is incorporated in the design. A novel feature of the design is the use of a leading drill rod which consists of a 6 ft. bar of 2 in. o.d. x 1½ in. i.d. tube of 3 per cent carbon steel. One end is adapted to take a standard tungsten carbide drill bit and the other to couple to standard Burnside drill rods.

The leading rod has eight splines to allow drillings to pass back. Tungsten carbide cutters are fitted around the periphery of the leading rod to grind up the drillings so as to ensure a free passage along the splines. This forms a true circular hole into which the leading rod is a neat fit. In trials this has proved a very effective means of achieving accuracy. With minor modifications to the setting screws, the rig has been mounted on a skid plate to work in a height of 2 ft.



A steel man-riding car 5425 ft. underground at International Nickel's Creighton Mine, Canada



## MINING MISCELLANY

A strike of major importance has been made by Hudson Bay Mining and Smelting Co. Ltd. on its properties in the Snow Lake area about 70 miles east of its major mines and plants at Flin Flon, Manitoba. Drilling to date indicates zinc, gold, copper, and silver in commercial quantities, with zinc predominating. The discovery is in an undeveloped area and will require time and expenditure of large sums of money to develop fully.

It is reported from Mexico that in the state of Jalisco there are numerous deposits of uranium. Under the present laws all lands containing uranium ore are taken over by the government; consequently the existence of deposits is not being divulged by the owners of the land. Plans are under way to change the mining laws so that uranium ore can be worked on a basis similar to that obtaining in the U.S. Rewards will be offered to prospectors and to owners of land on which deposits are found.

The only chemical plant in Africa equipped for processing lithium ore into metal salts, which closed at the end of March, re-opened on May 1 as a £100,000 plant with treble its former output. Situated at Gwelo, it has been in production for two years, selling its salts to Britain, but was unable to meet the growing demand for lithium salts and closed for re-organization. Lithium carbonate is extracted from the ore, which is mined at Fort Victoria. The unprocessed ore is used in the manufacture of television receiving set screens.

Canadian interests are investigating mineral possibilities in Morocco and groundwork is expected to begin in mid-May. A Canadian company, Kirkland Hudson Mines Company, has acquired the entire shareholding of Compagnie Minière de Menizla, which own 11 claims covering an area of 70 square miles near Agadir, containing a copper occurrence. Another venture in Montreal is headed by Canadian-Morocco Mining Corporation, a company financed by New Bristol Oils, Control Development Co., Trend Petroleum Co., and Surety Oils and Minerals. Canadian-Morocco has an option on 250 mining claims covering an area of over 2,000 sq. miles, reported to be one of the largest holdings in Morocco.

### PERSONAL

The annual general meeting of the Aluminium Development Association was held at 33 Grosvenor Street, London, W.1, on April 20, 1956. The retiring president, Dr. H. W. Clarke, presided and introduced the report for 1955. The Hon. Geoffrey Cunliffe was elected president for the ensuing year. He is deputy chairman and joint managing director of the British Aluminium Co. Ltd., and chairman of Aluminium Corporation Ltd. and the Aluminium Wire and Cable Co. Ltd. The new vice-president is Mr. Spence Sanders, of Almin Ltd. Mr. J. H. Mayes (Northern Aluminium Co. Ltd.) was appointed chairman of the Executive Committee in succession to Mr. Harold Goodwin, who had completed two years in this office.

At the annual general meeting of the London Chamber of Commerce on May 1, Sir Edward R. Chadwyck-Healey, Bt., M.C., was re-elected president.

Mr. Victor Brenner, managing director of Deutsch and Brenner Ltd., has been elected president of the Birmingham Exchange and Engineering Centre.

Mr. Richard T. Sutton has been appointed chief engineer of Lancashire Dynamo and Crypto's Willesden works.

Sir Alexander Stewart, one of Australia's leading industrialists, died in his home in Melbourne at the age of 77. He was chairman of Broken Hill South and of Metal Manufacturers, and until a few months ago of Dunlop Rubber Australia. Among the companies of which he was a director were Imperial Chemical Industries of Australia and New Zealand and Broken Hill Associated Smelters.

As from May 14, the London office of the Anglo American Corporation of South Africa Limited will be transferred to 40 Holborn Viaduct, E.C.1. (Telephone: Fleet Street 1545.) The London Buying Department remains at 11 Old Jewry, E.C.2. This change of address applies to all companies for which the Corporation acts in London.

As from May 14, the Rio Tinto Company, Ltd., Rio Tinto Finance and Exploration Co. Ltd., Rio Tinto Management Services (U.K.) Ltd. and the Pyrites Company, Ltd., are transfer-

ring their registered offices from Plantation House, Fenchurch Street, to 59/67 Gresham Street, London, E.C.2. The new telephone number will be Metropolitan 9101.

The British Electrical Power Convention will hold its annual meeting at Torquay from May 23 to 29 under the presidency of Sir John Dalton, chairman of W. T. Henley's Telegraph Works Co. Ltd. The theme of the 1956 Convention is "Electricity and Transport".

The annual general meeting of the Cornish Mining Development Association will be held in the lecture theatre, School of Mines, Camborne, at 7.30 p.m. on Thursday, May 17.

### AGENCIES WANTED

Mr. R. B. Jesudasan, a director of the South Indian Export Co. Ltd., P.O. Box 37, 5 McLean Street, Madras 1, is in the U.K. until May 20. He wishes to contact manufacturers of the following products requiring agents in India: transformers, h.t. porcelain insulators, steel tubular poles for transmission lines, A.C.S.R. conductors, electric switch and control gears, air compressors, heavy structural steel, steel pipes, cranes (mobile, overhead and dock), earthmoving equipment, all types of equipment for coal and gold mining, and certain automobile accessories. Manufacturers interested should write to Mr. Jesudasan, c/o Export Services Branch, Room 732, Lacon House, Theobalds Road, London, W.C.1. B.O.T. Ref.: ESB/11214/56. Telephone: Chancery 4411, Extension 900.

The Ridgway Company, 7608 Jensen Drive, Houston, Texas, have advised the British Consulate-General at Houston that they wish to contact U.K. manufacturers of sheet lead, lead traps and bends, lead fittings and tin and pig lead in blocks. Manufacturers interested should write direct to Mr. Ridgway, quoting prices in U.S. currency, c.i.f. Port of Houston. B.O.T. Ref.: ESB/10774/56. Telephone: Chancery 4411, Extension 776.

### CONTRACTS AND TENDERS

#### Indonesia

The Association of Importers and Wholesalers in Indonesia (V.I.G.I.) have issued a notice concerning requests for tenders from the Central Purchasing Office (KAPP) and the State Electricity Co., for the following items:

**Electrical material:** KAPP order no. and date, 0999/384, 11/4/1956; closing date of registration, 14/5/56; destination, Umbilin Coal Mining Industry, Sawahlunte.

**6,500 m. full-rubber cables:** KAPP order no. and date 0731/316, 13/4/56; closing date of registration, 15/5/56; destination, Umbilin Coal Mining Industry, Sawahlunte.

Further information available from V.I.G.I.'s office, 28 Kebon Sirih, Djakarta. B.O.T. ref.: ESB/11658/56. Telephone: Chancery 4411, Extension 738 or 771.

The International Co-operation Administration (ICA) has announced the following future procurements:

	Contract Period	Terminal Delivery Date	Amount (in U.S. dollars)
<b>Korea</b>			
Non-metallic mineral products (PA No. 89-99-A6-6290)	31/3/56- 30/9/56	31/3/58	40,000
<b>Cambodia</b>			
Non-metallic minerals and non-metallic mineral products (PA No. 42-640-99-A6-6231)	31/3/56- 31/7/56	31/3/57	300,000
<b>Turkey</b>			
Tin and tin base alloys (PA 77-660-99-A5-6222)	31/3/56- 30/9/56	30/9/57	1,000,000
Non-metallic minerals, iron and steel mill materials, lead and lead base alloys, nickel and nickel base alloys, tin and tin base alloys (PA No. 77-99-A5-6210)	31/3/56- 30/9/56	30/9/57	735,000
B.O.T. Ref.: ESB/10623/56/ICA. Telephone enquiries to Chancery 4411, Extension 360.			

#### Spain

Construction, mining and conveying equipment  
(PA No. 52-99-A3-6207) 16/4/56- 30/9/56 | 30/9/57 | 111,000 |

Construction, mining and conveying equipment  
(PA No. 52-99-A3-6206) 9/4/56- 30/9/56 | 30/9/57 | 930,000 |

B.O.T. Ref.: ESB/11450/56/ICA. Telephone enquiries to Chancery 4411, Extension 360.

## METALS, MINERALS AND ALLOYS

**COPPER.**—Copper in London has staged a definite rally since the middle of last week. On May 1, cash copper touched £335 10s.; the price has since fluctuated but the trend has been upward to an extent of nearly £20. The immediate cause of the rally was attributed to a sharply improved demand from West Germany. But the reason why it has persisted, and even gathered strength, is uncertainty; uncertainty about how far the fall should go, how long the bears could stay out of the market, and how well the reluctant buyers are stocked; a second uncertainty is how far the London price can diverge from the American level which seems for the present to be stabilized; and a third uncertainty is the possibility of strikes in the United States copper mining industry.

On the other side of the Atlantic the big producers are holding their price at 46 c. per lb. and the custom smelters hold theirs at 45 c. Interest has virtually vanished from these two quotations. The custom smelters are waiting on the big producers to make the next move and the big producers are waiting on the outcome of labour contract negotiations for the coming year. The two prices that now matter are the scrap price (this is in the curious position of reflecting nearby trends although it normally reflects the three months' position since it takes three months for bought scrap to be sold again as metal) which has fluctuated between 35 and 36 c.; and the forward custom smelters' price which reflects the betting on the possibility of strikes. Early on, copper for July-August was sold at 43½ c. which was reported to have been a good price if the strike did not materialize. Later, the price actually hardened a cent but fabricators were unwilling to commit themselves on what is in fact a straight gamble.

Meanwhile, Kennecott has now confirmed that it, too, will not sell its Chilean-mined metal below the price for its domestic output. All brass mills have now fallen into line basing their prices on electrolytic at 46 c.

Mr. Meissner, deputy-director, Copper Division, B.D.S.A., has forecast that copper supply will be more plentiful in the last six months of this year and that prices should "shake down to lower levels but probably not to the level prevailing in 1954". (In 1954 the price was 30 c. for most of the time.) "If strikes occur again for the same length of time as last year the price of copper on the London market may soar to a new high". Mr. Meissner is right; but, of course, the possibility of a new high in America is just as strong, especially since the Chileans would presumably revert to the L.M.E. for pricing their output.

Mr. Lally, president, Copper Range, has said that though the price of copper "seems a little soft, we are aware that most consumer inventories are very low and that it will take time to replace them, depending on business activity". He believed that if business kept its present rate inventories would be low all summer. He also thought that though there might be price adjustments they would be small and not enough to disturb the industry. It seems that though the American producers are very ready to express horror of high prices for copper they soon get reconciled to charging them and are not anxious to reduce them till forced.

Last week Lord Llewellyn, Governor-General of Rhodesia, officially opened the concentrator at Chibuluma; ore has been hoisted since October. The concentrator will handle 40,000 tons of ore a month.

Chilean output up till April 30 was 133,033 tons against 139,649 in 1955 in the same period.

**LEAD.**—There has been little change in the lead market in the United States where the price of 16 c. per lb. still prevails. A sizeable pick-up in business still attends more activity in the battery industry. Lead consumption in the United States in February declined to 96,998 tons from 106,843 in January. Output of refined lead at plants was less than in January but due entirely because of the shorter month. Average daily output was up. Deliveries from refineries were 8,200 tons less than production so that producers' stocks on the month rose from 24,092 to 32,300 tons—a rise of about one-third.

**TIN.**—The Texas smelter seems at last to be moving toward its closure and the International Tin Agreement seems about to start its work. The Banking Committee of the House of Representatives has approved a resolution to close down the smelter by January 31, 1957, if no satisfactory offer has been received by that date. The House Committee deleted a provision in the resolution that Congress should have a power of veto on any proposed sale. The representatives from Texas who have consistently opposed the closing of the smelter now appear to be reconciled to its closure. Perhaps more important, the In-

donesians appear to be reconciled for they have now announced that they are "taking the necessary steps for making effective" the deposition of the instrument of ratification. The interim committee of the I.T.A. has announced that Indonesia has intimated that it will accept an invitation to join the Council. It can be assumed that a good deal of preliminary work has been done and that the I.T.A. can start work very soon after the Indonesian ratification has been received.

Meanwhile, the general loss of interest in the Texas smelter which has spread in the last few weeks has tended to confirm the view that from now till the end of January the smelter will be kept going on a minimum of concentrates and will not require big contracts. This view has been a strong contributory factor to the softness in tin markets in the last week. The only source of encouragement to the market was the belief that the threatened strike at Penang was imminent and the knowledge that the union had declared that in the event of a strike the workers at Port Swettenham and Singapore would refuse to handle cargoes diverted from Penang. Later it was reported that fresh negotiations had been arranged, and that the danger of a strike had for the time receded. Within 24 hours of this report 1,200 dockers at Penang (out of a total labour force of 2,000) staged a wildcat strike on May 9. It is not known why the strike broke out or what effect it will have on negotiations but the immediate effect was to give a sharp fillip to prices and in New York the Spot Straits quotation rose from 97.62 to 98.37 c. per lb. On the same day the National Union of Plantation Workers rejected the Government's offer to mediate in a wage dispute and ordered an immediate "go slow" campaign on all rubber estates. The National Union of Mining Employees thereupon pledged "moral and all other" support.

The latest review of A. Strauss and Co. attempts an estimate of output costs in the main producing areas to compare their prospects under the I.T.A. It will be recalled that the central span of prices within which the buffer manager can neither buy nor sell is £720 - £800. In the Belgian Congo it is said that £720 would scarcely cover production costs and that if a cut of 25 per cent in output were to be imposed costs would rise to £800 a ton. Bolivian figures are hard to come by; but the industry is most certainly working at a loss and may be producing at £1,000 a ton. Nigeria is a difficult country to estimate for, because the cost of columbite must not be left out. No Siamese figures are available except for Siamese Tin Syndicate which has costs varying from £550 to £600 a ton. Malaya has the lowest costs with the best dredges producing at £300 but with an overall figure of around £600. Of course, all these figures, interesting as they are, would have to be revised in the event of cuts in output; and the cuts might well be most harmful to some of the cheaper producers—those producing with big dredges and requiring a high rate of output to keep costs down.

**ZINC.**—Zinc has continued a quiet market in the United States although there have been occasional spurts of interest mainly in prime western grade. Buying of special high-grade has also improved very slightly but there is no sign of any genuine recovery. The price structure is unchanged with prime western grade quoted at 13½ c. per lb. East St. Louis. American output of slab zinc decreased slightly to 88,786 s. tons in April from 91,690 tons in March. Domestic deliveries reached 74,788 tons against 84,204 tons a month earlier. A total of 4,570 tons went into the stockpile in April against 6,821 in March. In the present circumstance of the industry the fall in offerings to the stockpile is rather surprising. At the end of April zinc stocks had climbed to 47,907 tons from 40,038 tons at the beginning; while unfilled orders had fallen by about 7,000 tons.

**COLUMBIUM.**—Battelle Memorial Institute of Columbus, Ohio, has developed a technically feasible process for the treatment of columbium-uranium ore from a deposit owned by Beaucage Mines Ltd. at North Bay, Ontario. The process yields a product containing approximately 80 per cent columbium pentoxide, which is well above the market requirement. A uranium product of similar purity can be produced. A pilot plant for installation at Beaucage is almost complete.

**NICKEL.**—An investigation of the U.S. nickel supply is being considered by a House Small Business Sub-committee to determine the essentiality of the supplies of this metal currently available for defence and civilian use. It is understood that members of the Sub-committee feel that the investigation made earlier in this session of Congress of the Government's \$43,000,000 nickel plant in Cuba did not go far enough in assessing the overall supply of nickel which must be imported

into the U.S. The Philippine Cabinet has been studying a bill to speed the development of the nickel-iron deposits in the Government's Surigao mineral reservation. It was presented by the Director of Mines and provides for an extension of the areas which can be acquired and developed by private interests. Pilot-plant scale production of nickel is being undertaken in the Hohenstein Erstthal area of Eastern German. By 1960, the plant should be employing 1,000 workers.

**URANIUM.**—Mr. J. Reid, secretary of the Atomic Energy Board, has stated that under present contracts South African uranium production will reach £50,000,000 annually. Of the 27 South African mines scheduled for uranium output, 20 are already producing. The ten-year contracts under which coming producers will operate will extend far beyond 1965. By that time the board might be in a position to make sales of uranium to world markets, thus enabling it to continue purchases. It is anticipated that by 1958 Canada will produce as much Uranium as the U.S. and South Africa combined. In the U.S. an agreement has been signed between Climax Molybdenum and Mallinckrodt Chemical Works to submit to the Atomic Energy Commission a joint proposal for the construction and operation of a privately owned plant for the refinement of uranium compounds.

**ZIRCONIUM.**—The U.S. Atomic Energy Commission has announced the award of contracts for 5,500 tons of zirconium to be delivered over five years at a total cost of about \$75,000,000. The winning companies are the National Distillers Products Corporation, National Research Corporation, and Carborundum Co. The major portion of the zirconium delivered under the new contracts will be allocated to scheduled Navy reactor development projects and the remainder to meet the growing needs of A.E.C.'s own reactor programme. All three companies will build new plants to handle their contracts, each plant having an initial capacity of 750 tons a year—well in excess of the contracted amounts. In addition, the Bureau of Mines plant at Albany, Oregon, will be reactivated to produce about 150 tons of the metal annually, beginning in August 1956. It will be operated by the Wah Chang Corporation under a contract which will expire on June 30, 1958. A total of 100 tons of zirconium will be imported from Japan with deliveries expected to begin this year and be completed in 1957. All three companies hope to use their excess capacity to produce zirconium for commercial atomic plants and other non-atomic work. Potential uses are foreseen for the metal in chemical plants as well as in commercial atomic plants. Bids by the successful companies were in the region of \$6-\$7, compared with the current market price of \$12-\$14. Hitherto the scarcity and high price of zirconium has limited its use. Once zirconium becomes available in greater quantities, its outstanding resistance should lead to many further applications.

**DIAMONDS.**—The introduction of man-made diamonds on a commercial scale has been brought considerably nearer by the announcement that synthetic industrials are now being produced on a pilot plant scale by the Carboloy division of the General Electric Co. in the U.S. In making synthetic diamonds, G.E. scientists subject "a carbonaceous compound" to the highest combined pressure and temperatures ever attained, similar to conditions believed to exist 250 miles beneath the earth's surface. Since 1954, when the first diamonds were made in the laboratory, steady progress has been made in bridging the gap between the first experiment and the production line. According to Mr. J. S. Gillespie, manager of the company's diamond project, the manufacture of industrial diamonds could become an industry with an annual turnover of £71,000,000 within the next decade if the cost of man-made diamonds could be brought down below that of the stones now being mined. Since the U.S. is at present paying more than £17,900,000 a year for industrial diamonds and consumption is rapidly expanding, it is evident that the potential consequences of this development, both strategically and economically, are immense. It remains to be seen, however, whether man-made stones can be produced cheaply enough to present any serious challenge to the diamond industry.

## The London Metal Market

(From Our Metal Exchange Correspondent)

The London copper market has fluctuated in a rather uncertain manner and early this week advanced quite strongly on the reports of a broadening of interest both in the U.K. and on the Continent, although the highest levels reached were not maintained. There has been rather more interest in the U.S. for May/June copper which customs smelters offered at 45 c. per lb., but metal for May was none too plentiful, July/August copper was neglected owing to the uncertainty sur-

rounding the labour position in the next month or two, and some consumers are reported to show a preference for foreign metal as offering greater possibilities of delivery on time.

Tin has been quiet with an easier tendency. The Penang dockers had agreed to postpone any drastic action as the employers were to re-open negotiations on their wage claims, but on Wednesday they were reported to have staged a "wild-cat" strike without warning, resulting in the stoppage of loading of two ships in the harbour at Penang. No reason appears to have been given for this unexpected action, and one vessel is said to have sailed leaving 440 tons of rubber and tin on the wharf. This cargo was destined for Europe. The Interim Committee of the International Tin Council met in London on the 8th instant. This was a routine affair, as final steps by Indonesia to make their ratification of the Agreement effective are still awaited. On Thursday morning the Eastern price was equivalent to £767 per ton c.i.f. Europe.

Lead has been easier on fairly free sales in the open market on fears that the strike at Standard Motors over automation may spread and so affect offers catering for the motor industry. Demand from consumers has been rather quiet.

Zinc prices have also fallen back for very much the same reasons as for lead.

Closing prices and turnovers are given in the following table:—

	May 3		May 10	
	Buyers	Sellers	Buyers	Sellers
<b>Copper</b>				
Cash	£346½	£347	£350	£351
Three months	£341	£342	£343½	£344
Settlement	£347		£351	
Week's turnover	7,375 tons		5,325 tons	
<b>Tin</b>				
Cash	£755	£757	£752	£754
Three months	£752	£754	£751	£752
Settlement	£757		£754	
Week's turnover	780 tons		750 tons	
<b>Lead</b>				
Current half month	£111½	£111½	£111½	£111½
Three months	£111	£111½	£109½	£110½
Week's turnover	4,325 tons		4,850 tons	
<b>Zinc</b>				
Current half month	£96½	£96½	£95½	£96
Three months	£95½	£95½	£94½	£94½
Week's turnover	3,950 tons		4,250 tons	

## OTHER LONDON PRICES — MAY 10

### METALS

Aluminium, 99.5%, £189 per ton	Nickel, 99.5% (home trade) £519 per ton
Antimony—	Osmium, £24/27 oz. nom.
English (99%) delivered, 10 cwt. and over £210 per ton	Osmiridium, nom.
Crude (70%) £200 per ton	Palladium, £8 0s./£8 10s. o.z.
Ore (60% basis) 23s. 6d./24s. 6d. nom. per unit, c.i.f.	Platinum U.K. and Empire: Refined £34 0s. oz. Imported £38 0s./£39 0s. oz.
Bismuth (min. 1 ton lots) 16s. lb. nom.	Rhodium, £40/£42.
Cadmium 12s. 0d. lb.	Ruthenium, £16/£18 oz.
Chromium, 6s. 11d. lb.	Quicksilver, £85 ex-warehouse
Cobalt, 21s. lb.	Selenium, 112s. nom. per lb.
Gold, 249s. 1½d.	Silver, 78½d. f.o.z. spot and 78½d. f.d.
Iridium, £29/31 oz.	Tellurium, 15s./16s. lb.
Manganese Metal (96%-98%) £269 according to quantity	
Magnesium, 2s. 4d. lb.	

### ORES, ALLOYS, ETC.

Bismuth .. .. .	60% 8s. 3d. c.i.f.
Chrome Ore—	30% 5s. 0d. lb. c.i.f.
Rhodesian Metallurgical (semi-friable) 48%	£15 15s. 0d. per ton c.i.f.
Refractory 45%	£14 15s. 0d. per ton c.i.f.
Small 42%	£12 15s. 0d. per ton c.i.f.
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite, Raw (ground)	£21 0s./£22 0s. d/d
Molybdenite (85% basis)	8s. 2½d. nom. per lb. c.i.f.
Wolfram and Scheelite (65%)	264s. 0d./269s. 0d. c.i.f.
Tungsten Metal Powder (98% Min. W.)	21s. 0d. nom. per lb. (home)
Ferro-tungsten (80%-85%)	18s. 0d. nom. per lb. (home)
Carbide, 4-cwt. lots	£39 3s. 9d. d/d per ton
Ferro-manganese, home	£59 10s. 0d. per ton
Manganese Ore Indian Europe (46%-48%) basis 125s. freight	102d./105d. per unit c.i.f.
Manganese Ore (43%-45%)	97d./98d. per unit c.i.f.
Manganese Ore (38%-40%)	90d./92d. per unit
Brass Wire	3s. 4d. per lb. basis
Brass Tubes, solid drawn	2s. 8½d. per lb. basis



## COMPANY NEWS AND VIEWS

## Dull S. E. Conditions Follow Drops on Wall Street

Setbacks on Wall Street during the past week upset sentiment on the London Stock Exchange. After starting well on May 3, the Dow Jones Industrial Index moved up quickly to 516.44. But the receipt of mixed business news, and reconsideration of fears regarding the effects which tighter money conditions in the U.S. might bring, subsequently caused heavy falls, lowering the Index to 508.16 by May 9. Although London markets did not fully reflect this downward movement—*The Financial Times* Ordinary Index which started on May 3 at 192.8 actually was no lower than 192.0 by May 9—prices received little support and were dull in most sections.

After a bad start which terminated in the *F.T.* Gold Share Index dropping to a new low point, Kaffirs had made an encouraging recovery by Wednesday night and opened firm on Thursday morning. Outstanding amongst O.F.S. issues was F.S. Geduld which established a useful gain in anticipation of good current development results. Although talk of a 1 for 8 issue at £4 by this company may have prevented the rise from going any further, this factor did not in effect constitute an unduly depressing influence. It is, of course, realized that F.S. Geduld will need more money in the future, but the present time was considered premature. On disclosure of water troubles at the mine, Western Reefs eased. Merriespruit went lower on the new finance arrangements. The market did not take kindly to Randfontein's tax position and a fall also took place in East Champ d'Or on consideration of the uranium possibilities. On the other hand, Harmony were a strong market on talk of good development results.

Recent comment regarding the possibilities of man-made diamonds were responsible for declines all through the list in this section. Yet the fact that this development was likely to concern only industrial stones did not appear to have been given sufficient weight. Lower prices for copper at the beginning of the week were responsible for declines in Northern Rhodesians. But a later recovery in the metal price hardened these issues.

## Central Mining's Portfolio Expands

Quoted investments held by the Central Mining Investment Corporation at December 31, 1955, shown on the balance sheet at \$9,609,324 had a market value of £17,579,093. This compares with a book value of £8,691,530 and a market valuation of £16,825,906 at the end of the preceding year. Referring to the increase in investments amounting to some £1,000,000, the report emphasizes that only part of these securities will become immediately productive of income.

In common with most other mining finance houses, Central Mining experienced a sharp contraction in profits from share-dealing to £145,000 from £447,000 during 1954. Current assets of the Corporation also fell from £18,403,743 to £15,809,976. This was largely due to a reduction in British and South African Government securities from £7,510,062 to £4,876,924. Lord Bailhieu is chairman. Meeting, London, May 31.

## Union Corporation's Good Liquid Position

The consolidated balance sheet of Union Corporation and its subsidiaries at December 31, 1955, disclosed a net liquid asset position of some £2,500,000. Money at call and short notice totalled £4,475,000 (£3,775,000) while cash balances at £2,394,845 compared with £4,293,187. United Kingdom Treasury bills and tax reserve certificates totalled £832,426 (£150,000), while Union of South Africa, British and U.S.A. government securities shown at a figure of £4,784,057 had a market valuation of £4,788,095. During the past financial year ended December 31, 1955, Union Corporation's group profits expanded to £2,207,789 from £1,834,993. After taxation of £833,337 and dividends which absorbed £679,997 against £648,640, the balance carried forward was £652,479 compared with £623,874.

Referring to the recently floated Winkelhaak Mines, the Directors' Report stated that good progress had been made to date in the sinking of two small vertical shafts and two ancillary

**LONDON STOCK EXCHANGE PRICES -- MAY 3 - MAY 9, 1956**

[illegible]

ventilation winzes from the surface. Construction of the necessary housing and other surface requirements for initial work in the lease area had also proceeded. Lord Bracken is chairman. Meeting, Johannesburg, May 29.

### Operations of Rand Mines Group Expand

In his statement to shareholders of Rand Mines, Mr. W. M. Frames, the chairman, referred to the expansion of operations achieved by the Central Mining-Rand Mines group in general, and the Harmony Mine particularly during the past year. The overall results of operations on the Witwatersrand and extensions, and in the Orange Free State, showed mill throughput increased by 794,500 tons and the average yield of gold by .167 dwt. A total of 303,800 more ounces of fine gold were produced and the price received, excluding additional revenue in respect of gold sales for the period March-July, 1955, had been higher by 1s. 5d. an oz. Although working costs moved up by 1s. 6d. per ton milled, working profits from gold and uranium increased by £1,936,000 to £12,230,000. The increase in working profits was accounted for almost entirely by expansion of operations at the Harmony Mine.

### Kennecott to Provide a Further £1,500,000 for Merries

Provisional arrangements have been reached under which the Kennecott Copper Corporation of New York will subscribe for an additional £1,500,000 of loan capital in Merriespruit (Orange Free State) Gold Mining Company. The new loan stock will carry interest at the rate of 3 per cent per annum and rank *pari passu* with the existing £5,000,000 3 per cent Registered Unsecured Redeemable Loan Stock. Existing rights attaching to the £5,000,000 Loan Stock to convert 40 per cent into shares at 12s. 6d. will be cancelled. A right to convert up to £1,280,000 of the consolidated £6,500,000 3 per cent Registered Unsecured Redeemable Loan Stock into 3,200,000 ordinary shares of the company at 8s. per share at any time before June 30, 1961 will subsequently be substituted.

### Inflow of Water at Western Refs

Following recent blasting operations at Western Reefs Exploration and Development, an inflow of water occurred in a stope in the mine's Vaal Reef section to the south of the No. 3 shaft area. Although this accident inevitably resulted in some loss of production, the flow of water—which was at no time unduly severe—was brought under control and operations directed at sealing it off put into effect. The source of water, it is stated, is believed to have been an old borehole which, although plugged in the normal way, may have been affected by fissuring in higher ground through which it passes.

### Further Good Results from Zandpan Borehole

A third deflection in borehole Z6 at Zandpan Gold Mining Company's property in the Klerksdorp area of the Far Western Rand has revealed a value of 1,504 in. dwt. from a complete core recovery. This excellent result came from the Vaal Reef at a depth of 7,209 ft. and assayed 40.98 dwt. over 36.7 in. A second deflection also intersected the Vaal Reef but values amounted only to 107 in. dwt. Core recovery in this latter hole was, however, not complete.

### S.W. Africa Co's March Quarterly

A quarterly report from The South West Africa Company in respect of three months ended March 31, 1956, shows that a total of 963 tons of lead-vanadium concentrates were produced at the Abenab West Mine containing 465 tons of lead and 124 tons of vanadium pentoxide. During the previous quarter a very much higher figure of 1,694 tons, containing 716 tons of lead and 244 tons of vanadium pentoxide, were produced. Due to the abandonment of some of the mine's areas owing to unsafe working conditions, more than half the tonnage treated during the quarter was drawn from old tailings dumps. Operations on the lead-vanadium orebody, the report stated, have now almost entirely ceased. On the other hand, lead-zinc mining in the massive sulphide orebody has been commenced.

At Berg Aukas 147 tons of concentrates, containing 64 tons of lead and 27 tons of vanadium pentoxide, were produced. This compared with the previous figure of 92 tons of lead and 38 tons of vanadium pentoxide.

At the Brandberg West Mine, despite every effort made to improve production, output was less than half what was anticipated. Recently, certain drastic alterations in production methods have been introduced at the mine which, it is

hoped, will result in operations becoming profitable. During the past quarter 33.2 tons of tin and 18.5 tons of tungstic oxide were produced. This compared with 34.1 tons of tin and 13.0 tons of tungstic oxide previously.

The company hopes to bring its new lead-vanadium property—Baltika Mine—into production about January, 1957. Development results to date have been favourable.

### Mufulira and Roan Export Report Excellent Nine Months' Profits

Sharp rises in copper sales and profits before taxation have been reported by Mufulira and Roan Antelope Copper Mines in respect of the first quarter of 1956 as compared with the three months ended December 31, 1955.

	June Qtr. 1955 (l. tons)	Sept. Qtr. 1955 (l. tons)	Dec. Qtr. 1955 (l. tons)	Mar. Qtr. 1956 (l. tons)
<b>Mufulira</b>				
Sales .....	25,022	23,135	22,568	24,044
	£(000)	£(000)	£(000)	£(000)
Revenue .....	7,227	7,193	7,886	8,723
Costs .....	4,630	3,464	3,833	3,860
Difference in value of copper stocks .....	Cr. 463	Cr. 200	Cr. 434	Cr. 7
Surplus .....	3,060	3,929	4,487	4,870
Replacements* .....	201	264	239	225
Profit before taxation ..	2,859	3,665	4,248	4,645
<b>Roan Antelope</b>				
Sales .....	23,988	18,945	21,162	24,098
	£(000)	£(000)	£(000)	£(000)
Revenue .....	6,895	5,796	7,278	8,607
Costs .....	4,727	3,562	3,719	3,997
Difference in value of copper stocks .....	Cr. 467	Cr. 893	Cr. 279	Dr. 162
Surplus .....	2,635	3,127	3,838	4,448
Replacements* .....	152	147	126	109
Profit before taxation† ..	2,483	2,980	3,712	4,339

\* Subject to revision when year's accounts considered

† Estimated

Figures for the first nine months of the two companies' financial years ending June 30, 1956 show marked gains over those of the previous corresponding period. Sales of copper by Mufulira moved up to 69,747 tons from 61,369 tons, while net profits before taxation showed a considerable gain at £12,558,000 compared with £8,271,000 during the previous corresponding period. In the case of Roan Antelope, copper sales expanded to 64,205 tons from 58,994 tons while net profits before taxation increased to £11,031,000 from £7,400,000.

### Official Opening of Chibuluma's Concentrating Plant

The official opening by Lord Llewellyn, Governor-General of the Federation of Rhodesia and Nyasaland, of Chibuluma's concentrating plant took place in Northern Rhodesia on May 5. It will be recalled that this plant had been under construction since July, 1954. Hoisting started at the mine in October, 1955, and as considerable delay had been experienced in bringing the concentrator into operation, ore was subsequently stockpiled on the surface. Actual deliveries of copper and cobalt concentrates from Chibuluma should, therefore, not now be greatly delayed.

### Minerals Separation Sells More Copper Shares

During the past financial year ended December 31, 1955, Minerals Separation continued with its policy of reducing funds invested in Northern Rhodesian copper mining. This was not, said Mr. J. N. Buchanan, the chairman, due to any lack of confidence in copper or Rhodesia, but followed the general principle of establishing a wider spread of interests.

Although an up-to-date percentage of Minerals Separation's Rhodesian copper holdings in relation to its total portfolio has not been disclosed, it is apparent that a substantial stake is still held in this expanding field. Yet, sooner or later, the point must be reached when the company's stock ceases to have a "copper flavour". But for the moment, anyway, this event would appear to be some distance in the future.

Sales of copper shares were, no doubt, primarily responsible for a decrease to about £750,000 from nearly £1,000,000 in the margin between book and market valuation of quoted holdings at the end of 1955. On the other hand, reflecting subsequent re-investment, the book value of quoted holdings moved up to £2,366,007 from £1,480,958. In his statement to



shareholders for the year 1954, Mr. Buchanan referred to the considerable investments which had been taken in U.S. and Canadian equities resulting from sales of Rhodesian shares. It thus appears possible that a similar switch might have taken place during 1955. It is worth remembering that U.S. and Canadian investments are particularly attractive to companies such as Minerals Separation which have debenture stocks in issue. Under such conditions, yields from these holdings may be greatly enhanced.

Following its previous successes, which included a large participation taken in the expanding Foundry Services Group, and the purchase of J. W. Jackman Co., the pattern of Minerals Separation's future development would appear to lie towards substantial individual investment rather than small and diversified holdings. Should this be the case, further liquidation of the general portfolio must be anticipated. While this would naturally entail progressive reductions in Rhodesians—which to some might be a matter of regret—the trend towards a more widespread sphere of activity is undoubtedly sound.

Meanwhile, at their present price of around 18s. 3d., compared with a low point of 13s. 6d. in 1955, the company's 5s. stock units yield about 6½ per cent on the well-covered 25 per cent distribution. Although it would, perhaps, be unduly optimistic to expect a continuation of the recent expanding dividend trend during 1956, the company's stock units at their present price are obviously an attractive holding on the yield considerations alone.

#### Future for Burma Corporation's "B" Shares

At the recent meeting of Burma Mines Mr. J. R. Govett, acting in the absence of the chairman Mr. A. T. W. Paine, replied to a question regarding the possibility that the "B" shares of Burma Corporation (1951)—which represent Burma Mines' principal asset—might, in the absence of a market quotation, be requisitioned at par by the Burma Government.

While the company, he said, recognized that nationalization of the undertaking was the ultimate objective, they had no indication either that the Union Government intended to expedite the process or to do anything to weaken or dissolve the existing partnership which was essentially complementary in character. Mr. Govett stressed that it was not considered wise to do anything at present which might be interpreted as tending to weaken the partnership. Nor was it intended to discard valuation at par for purposes of nationalization in the absence of a market quotation. Mr. Govett emphasised that in the event of a recession in metal prices, or a setback to production in Burma, such valuation might be a useful safeguard. The company recognized, he said, that at a latter stage in the development of the Joint Venture, the par basis of valuation might have to be discarded in favour of the more realistic basis of market price.

#### Rio Tinto Pays 15 Per Cent Tax Free

With the recommendation of a dividend amounting to 15 per cent tax free on an issued ordinary capital of £4,250,000, the Rio Tinto Company has maintained its distribution in respect of the year ended December 31, 1955, at the equivalent of the previous year's level. It will be recalled that in 1954—prior to the 100 per cent scrip issue—dividends totalled 30 per cent which included a bonus of 15 per cent.

Since the end of the past financial year 1,700,000 new 10s. ordinary shares have been issued to stockholders at 50s. each. But although these new units do not rank for the 1955 dividend they will, of course, be eligible for that of the current year.

#### South Crofty's Expansion

Due mainly to a rise in fixed assets to £144,647 from £122,417 previously, and current assets to £130,308 from £81,687, the total balance sheet figure for South Crofty at December 31, 1955, expanded to £285,536 from £228,935. Current assets, including British Government Securities—having a market value of £24,486—and cash balances of £42,870, exceeded current liabilities of £41,877 by some £89,000. In addition to its issued ordinary capital of £117,000, South Crofty has a liability of £10,093 outstanding by way of a First Mortgage Debenture.

During the past financial year total revenue moved up to £375,107 from £306,642. After expenses, depreciation etc., a profit of £36,736 compared with the previous year's loss of £25,883. After a dividend of 7½ per cent which absorbed £6,800 (nil) the credit balance carried forward of £2,697 compared with the preceding year's debit balance of £27,189.

Mr. T. Pryor is chairman. Meeting, London, May 23.

## CONSOLIDATED MURCHISON (TRANSVAAL) GOLDFIELDS

### MR. S. G. MENELL'S REVIEW

The twenty-second Ordinary General Meeting of Consolidated Murchison (Transvaal) Goldfields and Development Co., Ltd., will be held on June 4 at Anglovaal House, 71 Fox Street, Johannesburg.

In his statement, circulated with the report and accounts for the year ended December 31, 1955, the Chairman, **Mr. S. G. Menell**, said:—

There was a further improvement in the demand for antimony during 1955, and a comparison of operations with the previous year shows that there was an increase in the tonnage milled from 85,188 tons to 139,673 tons, and there were corresponding increases in expenditure from £281,465 to £469,420, and revenue from £1,021,001 to £1,516,857.

The profit for the year after providing for taxation was £741,060. During the year £74,757 was appropriated for Capital Expenditure and the Company's Retrospective Liability for Silicosis and Dividends Nos. 22 and 23 absorbed £665,600.

In the Gravelotte Section of the mine exploratory development proceeded on the 11th and 12th levels and the Monarch Section was re-entered in July, 1955, with a view to determining the extension of the orebody in depth.

The demand for antimony to date continues to be satisfactory although there is a growing competition from Chinese and Russian sources. In accordance with the Company's policy sufficient stocks of ore and concentrates are being maintained to ensure that the Company is in a position to supply any demands which may be made for its products.

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## BRITISH ALUMINIUM

### INCREASED INCOME LORD PORTAL'S SPEECH

The annual general meeting of The British Aluminium Company, Ltd., was held on May 8 in London.

Marshal of the Royal Air Force **The Rt. Hon. Viscount Portal of Hungerford, K.G.**, in the course of his speech said:

The consolidated income for the year after tax amounted to £1,426,717, which compares with £733,821 for the previous year.

During the year our primary operations have been influenced adversely by the low rainfall which seems to have been experienced in large areas of the Northern hemisphere. Over our Scottish catchment areas the rainfall in 1955 was only two-thirds of the long-term average. This compelled us for some months to close our Super Purity refinery at Foyers, and to reduce load both at Kinlochleven and Lochaber by less than half. In turn, of course, the demands upon our alumina works were reduced. This loss of output naturally had an adverse effect upon our results and was particularly unfortunate in coming at a time of general metal shortage. I am sorry to say that we have still not been able fully to restore our load and that water storage for the time of year is not at a satisfactory level. Fortunately, our Super Purity refinery at Vikeland in Norway was not affected by power shortage and was able to operate at full capacity throughout the year. The demand for this product continues to be strong.

#### SUBSIDIARY COMPANIES

I am glad to be able to say that our subsidiary companies all operated satisfactorily throughout the year. The Alumina Co. Ltd., which previously held 70% of the shares of Aluminium Sulphate Ltd., disposed during the year of part of that interest to their partners in the project, Consolidated Zinc Corporation Ltd., so that the shares in this company are now held equally between the two partners. Magnesium Elektron Ltd., in which I reported last year the purchase of a controlling interest, had another satisfactory year, and various plans for extending the scope of their operations are being considered and implemented. Among our other subsidiaries, Aluminium Corporation Ltd. showed particularly good results.

#### PRICE OF INGOT

The price of aluminium ingot, which in this country is governed by the North American price, remained at £156 a ton throughout 1954, was increased to £163 a ton on January 1, 1955, and to £171 a ton on July 1, 1955. At the beginning of the current year the price was again increased to £179 a ton, and further to £189 a ton on April 1. Whilst the total increase in the price of ingot metal has been substantial, it is of interest to note that it has not been out of line with increases in the prices of other non-ferrous metals. These price changes of course necessitated adjustments in the prices of semi-fabricated products. In general the price of aluminium ruling in this market has been competitive with that of other countries, and world demand for the metal has continued to be buoyant.

Although development work was, to some extent, frustrated by shortage of metal, much work has been done on a number of interesting new applications. It is encouraging to note that while manufacturers of commercial and public transport vehicles have always been large users of our materials for bodywork, this has not been so in the case of ordinary passenger car bodies, but an increasing number of high-performance cars are now using aluminium alloys either for the whole of their bodywork or for major components such as doors and bonnets. The motor industry is also showing great interest in the use of anodized Super Purity sheet and strip for radiator grills, trim and other accessories. In the building industry, also, there is an increasingly promising extension of the use of aluminium for curtain walling, roof decking, corrugated sheeting and other purposes.

Our Research Department at Chalfont has continued its important contribution in all spheres of our activity, and has done most valuable work on new developments, particularly in welding, where the perfection of new processes is opening up most interesting prospects for increasing the use of our metal.

#### MOST IMPORTANT DEVELOPMENT

I now come to what is perhaps the most important single development in the history of your Company. After a number of disappointments in our search for a suitable location for additional aluminium ingot production, I am glad to be able to report that the creation of a new smelter, which we consider so vital to the Company's long-term future, is under way.

Before the war the operations of your Company were com-

pletely integrated, inasmuch as it then produced sufficient primary aluminium for its own needs and had a certain amount to sell. During and since the war the Company's fabricating capacity has been greatly increased, with the result that at the present time its facilities for the production of primary aluminium provide less than fifty per cent. of the metal required by its own fabrication factories and the balance has to be purchased from abroad. The needs of the Company are steadily increasing and, in addition, there is a growing demand for aluminium ingot both from the Company's subsidiary and associated companies and from other sources throughout the world.

Your Directors have for some time been anxious that the Company should be assured of its primary metal supplies from within its own organization, both for current use and to meet anticipated increases in requirements. At the same time they wish to make greater use of the valuable technique of metal production which has been acquired over sixty years of experience. Since the war, therefore, possibilities have been investigated in various parts of the world with a view to finding a location with the particular features necessary for servicing an aluminium smelter.

#### THE BAIE COMEAU SITE

One of the main considerations in selecting a suitable site for a factory of this kind is a large supply of electrical power at low cost, this being the factor which makes further expansion in the United Kingdom impossible. It came to our notice that such power might be available at Baie Comeau in the Province of Quebec. Of particular and exceptional attraction is the fact that at this site a large block of power sufficient to start operations can be available within two years, whereas other projects that have been investigated would involve appreciably more time owing to the fact that completely new hydro-electric plants would have to be erected. At Baie Comeau the main hydro-electric works are already available and all that is needed is an extension to the power house, the installation of additional generating units and a measure of river control.

Sufficient power is guaranteed partly from the Manicouagan Power Company and partly from Quebec Hydro-Electric Commission to ensure an ultimate capacity of 160,000 tons of aluminium ingot per annum. Works are at present in hand to complete the first half of this project during 1959.

#### PROPOSED CAPITAL INCREASE

You will have seen references to the formation of Canadian British Aluminium Co. Ltd., and you received with the Accounts a letter dated April 12 dealing with this matter in relation to an increase in the authorized capital of your Company and an extension of the Directors' borrowing powers. This letter deals fully with the Company's policy and I do not feel that I need enlarge upon it further. I would refer you to that letter for details of the immediate financial proposals, since any attempt to recapitulate them in abbreviated form might be misleading.

The only additional information I have to give is that, as you will have seen in an announcement published this morning, it is our intention, subject to the passing of the necessary Resolutions at the Extraordinary General Meeting to be held later to-day, immediately to issue 2,000,000 of the new Ordinary Shares for which we seek authorization. These shares will be offered to shareholders registered at the close of business on April 24 last at a price of 40s. per share, in the proportion of two new Ordinary Shares for every £5 Ordinary Stock already held.

The total Manufacturing and Trading Profit for the year amounts to £3,248,463, which is £1,248,830 greater than in the previous year.

When we add to the net income of the Parent Company the amount brought forward from the previous year and deduct the appropriations and provisions set out in the Directors' Report, we are left with the sum of £890,575. After taking into account the dividend for the year on the Preference Stock, we recommend a Final Dividend of Eight per cent on the Ordinary Stock which, with the Four per cent already paid, makes Twelve per cent less Tax for the year.

This leaves £493,825 at credit of Profit and Loss Account of the Parent Company; an increase of £24,723.

The report was adopted and at a subsequent extra-ordinary general meeting the capital of the company was increased to £12,000,000 by the creation of 5,000,000 ordinary shares of £1 each.



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## KONONGO GOLD MINES, LTD.

The twenty-second annual general meeting of Konongo Gold Mines, Ltd., was held on May 8 in London.

Mr. Robert Annan, M.I.M.M., Chairman, presided and in the course of his speech said:—

The results for the year again show an improvement. The tonnage of ore treated increased by 6,335 tons and in spite of a decrease in yield of 1.75 dwt. the revenue from gold increased by £45,644. The working expenditure on this higher rate of output increased by £18,637, the cost per ton of ore treated having been reduced by 6s. 6d. This is the result of increased efficiency and of the higher throughput.

After providing for taxation, charging £15,355 for depreciation, £17,804 for the interim dividend paid last May and bringing in the unappropriated balance from the previous accounts, there is an available balance of £128,966. Out of this your Directors recommend the payment of a dividend of 3d. per share less tax at 8s. 6d. in the pound in respect of the year ended September 30, 1955.

Your Directors regret that, owing to the strike which suspended all production from November 20, 1955, to February 29, 1956, and entailed an expenditure of £29,876 on maintenance of the property, they are unable to declare an interim dividend at the present time.

During the past year 40,660 tons yielding 38,538 ounces of gold were milled.

### STRIKE OF AFRICAN LABOUR

During the first six months of the current financial year all production was suspended for 14½ weeks owing to the strike of African labour and all the services necessary to the maintenance of the mine and plant were performed by the European staff. Operations are now proceeding normally and the working profit for April has just been advised as £16,686.

### DEVELOPMENT FIGURES

Development during the year amounted to 4,290 feet, of which more than half was off reef. Of the footage sampled, 1,070 feet or 54.17 per cent. proved payable averaging 22.4 dwt. over 50 inches.

In the Boabedroo Section the 15th Level exposed 305 feet averaging 24.4 dwt. per ton over 44 inches. Sinking below this level has now reached the depth for opening out the 16th Level.

On the 10th Level driving was continued to the south and including progress in the current year has disclosed 315 feet averaging 24.1 dwt. over 62 inches followed by 210 feet of sporadic values which, nevertheless, averaged 8.2 dwt. over 79 inches. Raising and winzling from this disclosure has so far extended 100 feet above and 15 feet below the 10th level with erratic results and I can do no better than quote the latest report from the Acting Manager dated April 24 in which he says: "It is as yet too early to predict how far this enriched zone will extend above and below 10 level, and the sporadic values obtained in the raise and winze necessitate caution in forecasting any possibilities. It would be fair to say that the prospects are encouraging but that until we have performed lateral development on No. 9 and 11 Levels covering this area nothing more than this can be said."

### ORE RESERVES

The developed ore reserves at September 30 last stood at 197,470 tons averaging 16.4 dwt., of which 15,665 tons averaging 12.2 dwt. is contained in pillars.

I have already referred to the strike of all our African labour, including the safety men, which was called in spite of the fact that the Government had appointed a second Commission of Inquiry to report on conditions in the Industry. The Miners' Union had refused to give evidence before the first Commission appointed in January, 1955. At the end of the Commission's hearing the strike collapsed and normal working was resumed at the beginning of March. The report of this Commission is still awaited.

### OFFER TO ACQUIRE LYNDBURST SHARES

For some years past we have been treating in our plant ore from the Lyndhurst concessions for account of that Company. Their orebodies are approaching exhaustion and the final extraction could not be carried out immediately under the existing arrangements. In consequence the Lyndhurst Company on January 24, 1956, resolved to go into voluntary liquidation and dispose of its assets. We have made an offer to the Liquidators to acquire the entire undertaking as at January 24, 1956, for a consideration of 811,589 Konongo shares of 1s. each and £10,000 in cash and this offer is being submitted to the Lyndhurst shareholders on May 29, 1956.

The report and accounts were adopted.

## EAST GEDULD MINES, LTD.

Mr. T. P. Stratten, the Chairman of the Company, in addressing members at the Annual General Meeting held at Johannesburg on April 26, 1956, stated that as a result of an improvement in the native labour supply during the greater part of the year, the tonnage milled in 1955 increased by 102,000 tons to 1,765,000 tons and as the yield per ton milled was slightly higher at 6.18 dwt. the output of gold rose by just over 6½ per cent. to 545,410 ounces fine. The average price received for gold was 1s. 6d. per ounce fine higher than in 1954. Accordingly the working revenue rose by £472,002 to £6,852,786. Working costs absorbed £2,760,925 and the working profit at £4,091,861 rose by £322,028 of which £204,699 was absorbed in taxation.

Provision for taxation amounted to £2,270,657 and after taking into account income from investments amounting to £66,615—mainly from the Company's holding in The Grootvlei Proprietary Mines, which remained unchanged—and the other items detailed in the Profit and Loss Account the profit for the year was £1,915,873.

£41,806 was appropriated to cover capital expenditure and an additional liability for European leave pay. Two dividends totalling 4s. 3d. per unit of stock, being 6d. more than in 1954, were declared absorbing £1,912,500. The carry forward was reduced to £570,212.

### DEVELOPMENT AND ORE RESERVE

The development footage accomplished on Main Reef was 13,039 feet or 3,413 feet more than in 1954. Of the 7,820 feet on reef and sampled 5,430 feet or 69 per cent. proved payable averaging 15.5 dwt. over 26 inches, equivalent to 404 inch-dwt.

The ore reserve decreased 300,000 tons to 10,700,000 tons averaging 5.8 dwt. over an estimated stoping width of 52 inches, the value being 0.1 dwt. higher and the width one inch more.

### TAXATION

The effect of the proposed change in the Formula Tax would be to reduce the rate of taxation by just under 5 per cent. as from January 1, 1956. This reduction, though comparatively small, and the other concessions to the Industry, were most welcome.

### SILICOSIS LEGISLATION

The Chairman also welcomed the recent announcement by the Minister of Mines that when silicosis benefits are increased by legislation which it is proposed to introduce this year the State will itself assume responsibility for the retrospective liabilities so created up to the extent of £10,900,000. The Industry would continue to carry the burden of providing for present and future liabilities in respect of silicosis compensation. It was difficult to predict, at this stage, the precise effect on the Industry of the increased benefits, since this depended on the number of cases certified by the Silicosis Medical Bureau, but the increase in the liability might well be a substantial one.

### RESULTS IN FIRST QUARTER OF 1956

During the first quarter of the current year the tonnage milled was 416,000 tons and the working profit £915,848. Development footage on Main Reef totalled 2,568 feet of which 1,620 feet were on reef and sampled disclosing 740 feet or 46 per cent. payable, averaging 10.5 dwt. over 22 inches, equivalent to 232 in-dwt.

### KIMBERLEY REEF EXPLORATION

The Chairman recalled that between 1951 and 1954 some development was carried out on the Kimberley Reef Horizon in the South-Eastern portion of the Mine, but that the values were disappointing. This work was carried out from a cross cut from No. 1 Shaft. With a view to exploring the Kimberley Reef in the vicinity of No. 2 Shaft development work from that Shaft on the Kimberley Reef Horizon will commence shortly.

The motion for the adoption of the Reports and Accounts which was proposed by the Chairman and seconded by Mr. J. MacG. Love was carried unanimously. The appointment to the Board of Mr. A. J. T. Goldby was confirmed and the retiring Directors Messrs. J. MacG. Love and J. S. Walker were re-elected.

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## ST. HELENA GOLD MINES, LIMITED

Mr. J. S. Walker, the Chairman of the Company, in addressing members at the Annual General Meeting held at Johannesburg on April 27, 1956, stated that in 1955 the tonnage milled increased by 197,000 tons to 1,238,000 tons, the yield improved by 0.82 dwt. to 5.34 dwt. per ton and the average price received for gold was 1s. 6d. per ounce fine higher than in the previous year. As a result of these favourable factors the working revenue at £4,155,300 was £1,218,889 higher than in 1954. While the cost of labour and stores continued to rise the increasing scale of operations enabled the cost per ton milled to be reduced by 1s. 2d. to 40s. 8d. per ton milled. The working profit for the year at £1,640,318 was more than double that for 1954. He felt sure that members would agree that all personnel on the Mine were to be congratulated on the progress made last year.

He stated that after taking into account the items detailed in the Profit and Loss Account the profit for the year was £1,585,052 making with last year's unappropriated balance of £648,902 a total of £2,233,954 available for appropriation. Capital expenditure amounted to £1,489,377 and after allowing for other appropriations totalling £61,589 the balance carried forward was £682,988.

### DEVELOPMENT AND ORE RESERVE

The total development footage driven during the year was 48,340 feet and of the 17,850 feet on Basal Reef and sampled 9,975 feet or 56 per cent. proved payable having an average value of 12.0 dwt. over 32 inches, equivalent to 384 inch-dwt. While the payable footage was somewhat less than in the previous year it was sufficient to increase the ore reserves by 250,000 tons to 3,000,000 tons. The value was 0.1 dwt. higher at 6.0 dwt. and the estimated stoping width was unchanged at 55 inches.

### IMPROVED YIELD

There had been a gratifying improvement month by month in the yield from 4.82 dwt. in January, 1955, to 5.75 dwt. last December. This improvement was to be expected as the mine settled down but it had been helped by increased sorting of waste underground and by the contribution of tonnage from the Northern section of the mine where, as he mentioned last year, good development results were being obtained.

### EXPANSION PROGRAMME

As part of the programme of expanding operations to a scale appropriate to the Company's large lease area the capacity of the Reduction Plant was to be increased to over 150,000 tons per month and a new shaft, No. 2 Shaft, was being sunk to serve the North-Eastern portion of the property. The first stage of the extensions to the Reduction Plant increasing the capacity to over 125,000 tons per month had recently been completed. It was intended gradually to increase the tonnage treated but the extent to which this could be done depended mainly on the supply of native labour.

Satisfactory progress had also been made in the sinking of No. 2 Shaft which at the beginning of the week had reached a depth of 1,898 feet below surface and had been concrete lined to a depth of 1,846 feet. The shaft was expected to intersect the Basal Reef Horizon at a depth of 4,100 feet but would be carried down to a final depth of 5,500 feet.

### CAPITAL EXPENDITURE AND FINANCE

The Chairman stated that at the Annual Meeting in 1955 he had mentioned that the new shaft and the extensions to the Reduction Plant would involve an expenditure of about £4,500,000 to be financed out of profits and that it was anticipated that about one-third of this would be expended in 1955 the balance being spread more lightly over the succeeding years. In point of fact actual capital expenditure on this programme in 1955 was £1,228,500 or nearly £300,000 less than expected although the rate of sinking had been rather better than estimated. As a result of this somewhat quicker shaft-sinking programme which it was hoped to maintain in 1956 and with the consequent need to bring certain items forward in the timetable it appeared likely that capital expenditure in the current year would not be greatly less than in 1955. Total capital expenditure this year might be £1.3 million as against just under £1.5 million for the previous year.

The Balance Sheet at December 31, 1955, disclosed a healthy position with net current assets amounting to £734,602. In particular, except for housing loans, repayable in moderate annual instalments, the Company had no loan debt. However, in view of the scale of operations and the capital expenditure

programme ahead, to be financed out of profits still to be earned, it was prudent to maintain a substantial cash position.

### MAIDEN DIVIDEND

In March of this year the Directors declared a maiden dividend of 6d. per share which was an important and gratifying event in the Company's progress. It was intended to consider the declaration of dividends in March and September of each year though the Company's financial year would continue as at present to end at December 31.

### RESULTS IN FIRST QUARTER OF 1956

During the first quarter of 1956 the ore milled totalled 288,000 tons and the yield was 5.87 dwt. The working profit was £453,055 and capital expenditure amounted to £279,887. The development footage driven totalled 9,808 feet, of which 3,330 feet were on Basal Reef and sampled, disclosing 2,015 feet or 61 per cent. payable, averaging 13.5 dwt. over 31 inches, equivalent to 418 inch-dwt.

The motion for the adoption of the Reports and Accounts which was proposed by the Chairman and seconded by Mr. J. M. M. Ewing was carried unanimously. The retiring Directors, Messrs. C. B. Anderson, J. M. M. Ewing, H. F. Oppenheimer and M. W. Richards, were re-elected.

## BURMA MINES LIMITED

At the fifth Annual General Meeting of Burma Mines Limited held in London on May 1, Mr. A. T. W. Paine, acting in the absence of the Chairman, Mr. J. R. Govett, replied at some length to a question as to the possibility that the "B" shares of Burma Corporation (1951) Limited, now held by Burma Mines Limited as its principal asset, might be requisitioned by the Burma Government at par in the absence of a market quotation.

The Directors recognized that Nationalization of the undertaking was the ultimate objective, but they had no indication either that the Union Government intended to expedite the process or to do anything to weaken or dissolve the existing partnership, which was essentially complementary in character.

They did not think it wise at this juncture themselves to do anything which might be interpreted as tending to weaken the partnership; or finally to discard valuation at par for purposes of Nationalization in the absence of a market quotation, since in the event of a recession of metal prices, or a setback to production in Burma, it might still be a valuable safeguard.

They recognized that at a later stage in the development of the Joint Venture the par basis of valuation of the "B" shares of Burma Corporation (1951) Limited held by Burma Mines Limited might have to be discarded in favour of the more realistic basis of market price.

The Chairman paid tribute to the remarkable success achieved in rehabilitating the enterprise, which was largely due to a nucleus of senior men who gained their experience in the service of the old Burma Corporation and are now loyally serving the new Joint Venture.

The Directors' Report and Accounts were unanimously adopted and the retiring Directors re-elected.

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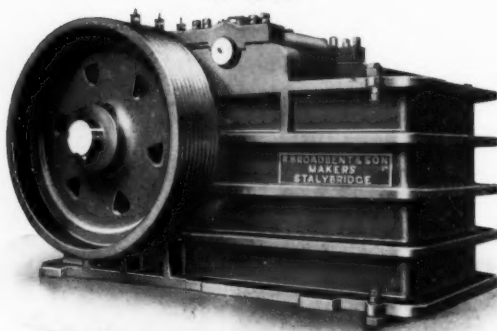
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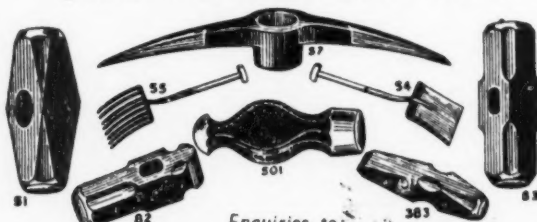
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